

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Boston, Mass., and additional mailing offices

© 1977 by Computerworld, Inc.

ear

January 24, 1977

Vol. XI, No. 4

CW SAMPLE COPY
MI48103U
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48103

Brrrrr!

By Ann Dooley
Of the CW Staff

DAYTON, Ohio — It's been a rough winter all across the country, but at the DP center of Dayco, a manufacturing company here, they opened the windows to let some of that cold air in.

Not that they liked the -20° weather, but it was the only way to keep the computer cool when the air conditioners had to be shut down to conserve energy, according to Les Pitstick, DP manager.

Because of the power drain caused by the severe weather, the data center's air-conditioning system was turned off last week. To maintain the IBM 370/125 at

a moderate temperature, all the windows in the DP center were opened, letting in the frigid air, Pitstick said.

All went well until it was discovered that static electricity had begun building up in the card readers from the dry, cold air. So the air-conditioning system was reactivated — only to blow a fuse because the unit had frozen from the room's very low temperature.

Damage was estimated at several hundred dollars, according to Pitstick.

In the meantime, the windows remain open, operations continue and the employees' teeth never stop chattering.

Bell Vague on Participation In U.S. vs. IBM Litigation

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — U.S. Attorney General Griffin B. Bell will turn over supervision of all cases in which he had a hand while in private law practice to the Deputy Attorney General if they come up in the Justice Department, he told the Senate Judiciary Committee at confirmation hearings here last week.

However, Bell did not directly answer any questions on whether he would take part in decisions on the massive government antitrust suit against IBM.

Bell's law firm — King and Spalding in

Atlanta — represents IBM on routine commercial matters, but he apparently has not had a direct hand in those cases, although he would share the profits from that work as a partner in the firm.

Conflict in Lineup

If Bell decides not to take part in U.S. vs. IBM, responsibility for handling it would go to the Deputy Attorney General. Sources last week indicated the person in line for that post is F.A.O. Schwarz Jr. (see story on Page 5).

If Schwarz does become Deputy Attorney General, it would add a new wrinkle to the Justice Department lineup because he is currently a lawyer with Cravath Swaine and Moore, the firm representing IBM in the antitrust case. Schwarz would therefore have to take himself off the case.

Noting that King and Spalding "must be a good [law firm] because you have some very substantial clients," Sen. John H. Heinz (R.-Pa.) raised the question of conflict of interest.

Heinz specifically referred to such clients as "IBM, which is currently in litigation with the Justice Department on an antitrust case," and to Coca-Cola, commenting that not everyone drinks Pepsi.

Bell is "aware of the conflicts problem," he responded, and said he "hopes to avoid"

(Continued on Page 5)

With Software, Hardware Additions

IBM System 32 Grows in Sophistication

By Don Leavitt
Of the CW Staff

ATLANTA — A Fortran IV compiler, an enhanced System Control Program (SCP) and several other pieces of software just introduced by IBM for its System 32 expand the range of users that might be interested in that small computer, industry sources agree.

Originally touted as a packaged solution to the problems of DP-naïve organizations, the system now includes the tools of some of the most sophisticated computer users.

In addition to the SCP update and Fortran, IBM has announced a Subroutine Library-Mathematics (SL-Math), a Statistical System and a Job Analysis System (JAS/32). Hardware, including a Control Storage Increment to handle the Fortran programs and a print belt with Fortran symbols, was also introduced.

The Fortran compiler "contains features defined in" the American National Standards Institute (Ansi) 1966 specifications, IBM said. Thus it appears to be a subset of that standard and of the revised standard now under Ansi review.

The compiler is said to have better internal performance than the Fortran available on either the IBM 3 or the 1130.

A source program entry facility and an overlay capability are included in addition to features of the language itself, IBM said.

The SCP revision adds capabilities such as scientific macros, job stream support, improved data management and library techniques, a spokesman noted. The enhanced SCP is required to use the Fortran compiler or any of the object programs it generates, he added.

SL-Math is written in Fortran IV and in-

cludes routines to help compute functions such as array operations, linear equations, roots of functions, differentiation, interpolation and approximation, according to the company.

Also written in Fortran IV, the Statistical System was designed to work with stepwise linear regression analysis, factor analysis, variance analysis and polynomial curve fitting. As with SL-Math, this package

(Continued on Page 8)

Because Approval Appealed in Court

FCC Delays Start of Interstate Dataspeed Tariff

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. — Federal Communications Commission (FCC) approval of an interstate tariff for the AT&T Dataspeed 40/4 was sent into court last week and, as a result, the tariff did not go into effect as scheduled.

Although AT&T had filed interstate rates for the device following FCC approval, the commission voted last week to postpone the effective date for 15 days or until the U.S.

Court of Appeals for the Second Circuit in New York can consider the issue.

The court has scheduled oral arguments to stay the FCC approval for Jan. 25, according to a court spokesman.

A petition for reconsidering the FCC approval was first filed by IBM. The Computer & Communications Industry Association (CCIA) filed similar petitions with the FCC (see story on Page 39) and the U.S. Appeals Court in the District of Columbia.

The District of Columbia court ruled the CCIA petition should be combined with the IBM proceeding in New York. The FCC denied the CCIA request to reconsider its own decision, but it then postponed the effective date of the AT&T tariff pending consideration by the New York court.

Commenting on the latest FCC tariff postponement, an AT&T spokesman said "we are obviously disappointed since the [FCC's] delay makes our customers again wait for a service they need and want."

"However, we are confident the court will uphold the commission's decision," he added.

Costs to Users

The rates filed by AT&T would have cost users \$68/mo for a basic keyboard/display version of the Dataspeed 40/4 with an additional \$102/mo for an attached printer. Installation would have added a one-time charge of \$100.

In addition, the controller needed for various configurations including clusters of CRTs up to a total of six devices would

have ranged from \$157- to \$185/mo depending on the configuration required by the customer. Installation of the controller would have cost an additional \$100.

The proposed interstate rates were the same as originally filed early in 1976. In March of last year, however, the tariff was denied when Walter Hinchman, chief of the FCC's Common Carrier Bureau, issued a ruling that the Model 4 in the Dataspeed 40 series was a DP device and therefore could

(Continued on Page 6)

Coast Guard Admits DP Systems Limited In Halting Oil Spills

By John P. Hebert
Of the CW Staff

WASHINGTON, D.C. — Although the U.S. Coast Guard uses computerized vessel-tracking systems, it can't prevent disasters like that involving the Argo Merchant because it has no coastal authority beyond the three-mile limit.

The Argo Merchant, which strayed from the shipping lanes leading into Boston Harbor in mid-December, grounded and broke in half, losing most of the 7-1/2 million gallons of oil it carried to the Atlantic Ocean.

"According to U.S. Coast Guard marine casualty statistics, the number of collisions and groundings in U.S. waterways rose

(Continued on Page 8)

What Verdict Lurks for IBM? Maybe the Shadow Knows...

By Molly Upton
Of the CW Staff

LOS ANGELES — Court observers here are asking who hired the shadow jury, but so far there is no answer.

Six people have been faithfully attending only those portions of California Computer Products, Inc.'s (Calcomp) antitrust suit against IBM open to the jury, and they appear to be a shadow jury.

A shadow jury would presumably be asked to render a "verdict" at the trial's conclusion, giving attorneys some feeling for how and why the verdict was reached and whether another jury would be likely to come to the same conclusion. This would aid in the preparation of future cases.

The six persons who have been filing into

the courtroom almost every day take notes occasionally, as do the real jurors, but attend only those portions of the trial at which the real jury is present.

There are two blond women in their 20s, a middle-aged woman, two men about 26 — one clean-shaven, the other with a moustache and longer hair. There is also a dark-haired woman, probably in her late 20s, who said she has been a court reporter.

Last week the older woman stayed during a bench conference and then was absent the following day. One theory is that the members of this group are trying to squelch suspicion in the courtroom that they are a shadow jury.

Even Judge Ray McNichols seems to have

(Continued on Page 6)



EDITORIAL

Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Associate Editor	Esther Surden
Associate Editor	Molly Upton
Assistant Editor	John P. Hebert
Computer Industry Editor	Toni Wiseman
Washington Bureau Staff Writer	Edith Holmes
Chief Copy Editor	Catherine Arnst
Copy Editors	Cheryl M. Gelb
	Bobbi C. Sternheim
	Barbara T. VanScoyoc
	Ann Dooley
Photography Editor	Denise Petski
Editorial Assistant	Jim Orton
Editorial Cartoonist	
Bureaus:	
London	Roger R. Frampton
Munich	Dr. Gerhard Maurer
Asia	Hidetsuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone
Contributing Editor	Edward J. Bride

SALES

Vice President/Marketing	Roy Einreinhofer
Advertising Administrator	Judy Milford
Display Advertising	Sara Steets
Classified Advertising	Pam Palmer
Recruitment Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen

CIRCULATION

Vice-President/Circulation	Margaret Phelan
Circulation Manager	Barbara Jeannetti

PRODUCTION

Manager	Lee Vidmer
Supervisor	Henry Fling
Assistant Manager	Peter Holm

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529.

OTHER EDITORIAL OFFICES: **England:** Computerworld Publishing Ltd., 140-146 Camden Street, London NW1 9PF. Phone: (01) 485-2248/9; Telex: 264737. **W. Germany:** Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristenstrasse 11. Phone: 36-40-36/37. Telex: 5215350. **Asia:** Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160. Copyright 1977 by Computerworld, Inc. All rights reserved.

50 cents a copy: \$15 a year in the U.S.; \$23 a year for Canada and PUAS; all other foreign, \$40 a year. Four weeks notice required for change of address. Please allow six weeks for new subscription service to begin.

Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Walter Boyd. *Computerworld* can be purchased on 35 mm microfilm in half-volumes (six-month periods) through University Microfilm. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700.

COMPUTERWORLD, INC.

Board Chairman/Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Einreinhofer
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Massachusetts 02160.

Preview of Interim Report?

Terminals Not Bank Branches: EFT Unit

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C.—Recent testimony by the National Commission on Electronic Fund Transfers (EFT) gave the industry a preview of what to expect when the commission's Interim Report appears Feb. 23.

In testimony before the Senate Subcommittee on Financial Institutions, Commission Chairman William B. Widnall and several other commissioners went as far as saying EFT terminals are not branch banks and should not be regulated as stringently.

This, however, was only a first step, and the question of exactly how terminals should be regulated will be addressed in the Interim Report, sources said.

At meetings in Jacksonville, Fla., this month, the Commission's Regulatory Issues committee seemed to be leaning toward regulating the services the terminals provide rather than the deployment of the terminals themselves.

Another consensus seems to be that the regulation should apply to funds transfer functions and not to information-type functions such as credit authorization and check verification.

The committee is also expected to address the question of sharing EFT facilities.

While the commission's Regulatory Issues Committee was discussing these issues in Jacksonville, the Department of Justice submitted to the commission its position on EFT facilities sharing. Its view: Sharing should be based on the free market approach, and existing federal antitrust laws should govern EFT activity for the time being.

In its policy statement, the Justice Department listed what it saw as the numerous drawbacks to mandatory sharing. In support of its proposed free market scheme, the department noted that while antitrust laws encourage individual rather than joint approaches in the competitive marketplace, they also recognize that in certain situations a joint venture can be both necessary and tend to foster competition.

The Justice Department also suggested the commission might want to expedite procedures for entry into EFT to provide equal opportunity for all.

It did not, however, issue any guidelines for the procedure.

Although the commissioners advocated less stringent laws for EFT systems, they cautioned they did not intend "to recommend any alteration in the division of powers between the individual states and the Federal Government in regard to the

regulation of depository institutions."

Proper guidelines for the regulation of the deployment of EFT terminals are found neither in the McFadden Act nor the 1933 Banking Act. These statutes, as interpreted, restrict deployment of EFT terminals and thereby reduce the availability of EFT services to consumers, according to commission members' testimony.

"If these restrictions remain in place, the deployment of EFT terminals and the development of EFT services may well be impeded," they told the subcommittee.

The greatest impediment to implementing the technology that can provide the benefits of EFT to the consumer is the uncertainty about the legal environment within which EFT systems will operate in the future, their testimony indicated.

The commissioners cited consumer concern over the changes EFT will bring that will reduce the benefits they obtain from the existing payments mechanism without increasing other benefits and services. These include the loss of float and stop-payment privileges.

In the commission's view, "the apparent inconveniences to the consumer associated with the movement toward EFT can be greatly reduced by the private sector if a legal framework is created in which EFT terminals can be installed with reference not to existing law governing branching, but rather a new set of rules."

Consumers are also concerned about possible violations of their privacy through misuse of an EFT system and the higher risks of fraud and theft as well as the reliability of EFT systems, the subcommittee was told.

While the commission is still investigating these concerns, testimony pointed out that "if EFT development jeopardizes individual rights, and if the private sector does not respond, government action will be required."

Close attention, however, will first be given to the ability of the private sector, the states (through the Uniform Commercial Code) and the Federal Reserve System to address these problems, the commissioners said.

FCC Gives Go-Ahead to SBS

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C.—The Federal Communications Commission (FCC) has given approval for Satellite Business Systems (SBS) to operate a domestic satellite communications service for data, voice and image transmission users.

SBS is a partnership made up of Comsat General Corp., IBM and Aetna Life and Casualty which will provide satellite service in the 12- and 14 GHz bands using all-digital transmission methods.

Service will be provided in the 48 contiguous states using two stationary orbit satellites and "several hundred small earth stations," along with tracking, telemetry and command centers at Franklin Lakes, N.J., and Agoura, Calif.

When the SBS application was first proposed, opponents cited possible built-in advantages between the satellite carrier and IBM. In order to cover this possibility, the FCC ruled SBS cannot have bundled offerings of DP and communications services.

In addition, IBM will not be allowed to "either sell or promote SBS services to

IBM customers or to offer a discount or other preference to IBM customers who also subscribe to SBS.

"And SBS will not be allowed to sell or promote IBM DP equipment or services," the FCC added.

The commission said that even if it were to accept the various arguments that SBS entry could lessen competition, the "public interest benefits outweigh potential anticompetitive concerns... particularly in view of the conditions it had imposed."

Nevertheless, the FCC said it would scrutinize the market and SBS "on a continuing basis," looking for the earliest possible indications "that future action would be appropriate."

SBS will become a competitor of AT&T and other carriers when it begins operation.

Responding to the FCC decision, an AT&T spokesman said "by 1980, when SBS is scheduled to start operations, we hope that the FCC would have eliminated its original three-year restriction against AT&T providing private-line service on its domestic satellite system."

On the Inside This Week

NEWS

Stamp Collecting DP Style	4
Web of IBM Ties to Carter Administration Expands	5
Vendors Free to Make Gear for Any Software: IBM	6
Memos Show IBM Set 370 Prices to Encourage Rentals ..	7
Germans Pass Privacy Law With Age Limit on Data	9
Data Bank Being Tested to Diagnose Birth Defects	10
DP System Ensures All's Well at Amoco Oil Wells	11

EDITORIAL

Editorial: Deterring Disasters	14
Human Connection: 'Bionic Redemption' Urged	15
Taylor Report: DP Makes Evading Controls Practical ...	16
Third-Party Switcher May Be Best EFT Net Service	16
DP Industry's Youth No Excuse for Its Hiring Practices ..	19
Why Would a DPer Ever Give Up His Vacation Rights? ..	20

SOFTWARE & SERVICES

Human Connection: Consortium Provides Course	21
Data Directory Built for IDMS	22
Quantity, Quality Highlight Latest DP Bibliography	23
'Homemade' Monitor Puts 360/40 Data Entry On-Line ..	24

COMMUNICATIONS

Flatter Rate Structures Coming: Selwyn	25
Business Service Finds Terminal a Necessity	28

TERMINAL TRANSACTIONS

ITS Unveils Micro-Based Product Line	27
Service Provides On-Line CRTs to Customer Banks	30

SYSTEMS & PERIPHERALS

Broadening Scope of DP Changing Manager's Role	31
Key-to-Disk Net Switch Brings Benefits to Steel Firm ...	32

MINIWORLD

B800 Provides Twice B700's Power	36
Capability Lets GRI System Interface With 3742s	37
Minis at Ford Lab Increase Accuracy, Save Money	38

COMPUTER INDUSTRY

IBM Lease Plan Halved PCM Market	39
CCIA Asks Tariff Stay, Charges FCC Violated Rules	39
Information Processing Drops on Forbes Industry List ..	42
GE Considered Attempt to Compete With IBM Risky	45

Memos Show IBM Considered Leaks to Combat Lessors

By Molly Upton
Of the CW Staff

LOS ANGELES — IBM apparently felt the financial community was in danger of becoming too enamored with leasing companies in 1968 and decided to let Wall Street know that future conditions under IBM's control might change the lessors' profit pictures.

That scenario of almost a decade ago was presented through memos introduced here recently at the California Computer Products, Inc. (Calcomp) vs. IBM antitrust trial.

And, the documents showed, an IBM director who was a former president of the New York Stock Exchange was chosen to play a role.

A draft memo, prepared by Treasurer K.N. Davis for signature by Chairman

Quarter Earnings Set Record for IBM; Year Net Up 20.5%

By Toni Wiseman
Of the CW Staff

ARMONK, N.Y. — IBM's earnings for the fourth quarter of 1976 set a record for any quarter in the company's history.

Fourth-quarter earnings rose 14.5%, an increase attributed in large part to a strong showing outside the U.S. and an increase in sales rather than rentals.

Earnings for the year climbed 20.5%.

For the quarter ended Dec. 31, 1976, earnings totaled \$674 million or \$4.47 a share compared with \$589 million or \$3.94 a share in the year-ago period.

Revenues also rose, to \$4.5 billion compared with \$4.06 billion in the same 1975 quarter.

Year Results

In the year, IBM's earnings reached \$2.4 billion or \$15.94 a share on revenues of \$16.3 billion compared with 1975 earnings of \$1.98 billion or \$13.35 a share on revenues of \$14.4 billion.

This represents a 20.5% increase in earnings and 12.9% increase in revenues.

"Operations outside the U.S. for the year 1976, included in the consolidated results, showed net earnings of \$1.3 billion, an increase of \$212 million over 1975," according to Frank T. Cary, chairman of the board.

"Gross income from those operations was \$8.1 billion, an increase of \$882 million over the year before," he added.

During 1976, purchases of DP equipment by customers were strong around the world, with the fourth quarter setting a historic high, Cary noted.

IBM's revenues from outright sales rose 21.1% to \$1.84 billion in the quarter, and 31.1% to \$5.96 billion in the year. Rentals, by comparison, rose only 5.1% to \$2.67 billion and 4.6% to \$10.3 billion in the quarter and year respectively.

Domestic vs. Foreign

Profits and revenues from domestic operations increased by slightly higher percentages than did the results from foreign operations, but foreign business continued to account for more than half of IBM's results.

Earnings from foreign operations rose about 19% to \$1.32 billion, up from \$1.11 billion in 1975, accounting for almost 55% of IBM's total earnings.

Foreign revenues rose about 12% to \$8.15 billion, up from \$7.27 billion a year ago. Foreign revenues therefore accounted for slightly more than 50% of total revenues.

U.S. operations earnings climbed 22% to \$1.08 billion, up from \$884 million in 1975, while U.S. revenues rose nearly 14% to \$8.15 billion from \$7.17 billion a year ago.

Incoming orders were "significantly higher" in 1976 than 1975, Cary said, resulting in a year-end backlog well above that of a year earlier, despite the high volume of shipments during 1976.

Thomas J. Watson Jr. in September 1968, suggested the corporation confer with IBM director Keith Funston on how to tell Wall Street about "exposures" in the leasing company concept.

This apparently referred to the direct relationship between a lessor's rate of return and the lease-purchase multiplier set by IBM (see story on Page 7).

IBM at that time was planning a higher multiplier to increase the number of months it would take for monthly rental charges to equal the purchase price on 370s compared with those of the 360. Thus it would take longer for lessors to recoup their investments.

The Davis/Watson draft said: "We think that if investors and leasing company operators really understood the exposures in the leasing company concept, reduced activity should result, which would be helpful both to us and to investors who could get hurt by overspeculation in these stocks."

"Also, we are continuing to try to see whether there is anything we should be doing with the [Securities and Exchange Commission] or the New York Stock Exchange."

"We are working with outside counsel on this and we are going to ask Keith Funston to give us the benefit of his advice as well."

Leaks Discussed

Some memos written earlier — in June of that year — indicated IBM already had established communications with the financial community.

At that time, there was some speculation in the financial press about a possible future line of mainframes after a speech made by Gene Amdahl in Canada. That line eventually became the 370.

A June 24 memo, drafted for Frank T. Cary's signature by John R. Opel, then vice-president of the Corporate Finance and Planning Staff, to H.M. Sibley, assistant treasurer, outlined new guidelines for

controlling what technical people could tell members of the press and asked whether it would be "useful to 'leak' [information on the fourth generation] to the investment community."

In his reply, Sibley attached a news release from White Weld & Co. that indicated this investment firm already knew quite a bit about IBM's future plans.

The White Weld news release said in part: "In the past several months IBM has been discussing prospective corporate advances in circuit technology with the investment community. It has also explored the implication of such advances on the speed of computers and the cost of processing to the computer user."

In line with a response from IBM attempting to control speculation about the "fourth generation," White Weld remarked it expected evolutionary changes "in no way as far-reaching as was the 360 at the time it was introduced."

Life of Georgia Depends on ADR's ROSCOE® For Faster Job Turnaround, Faster Maintenance and Expanded System Access

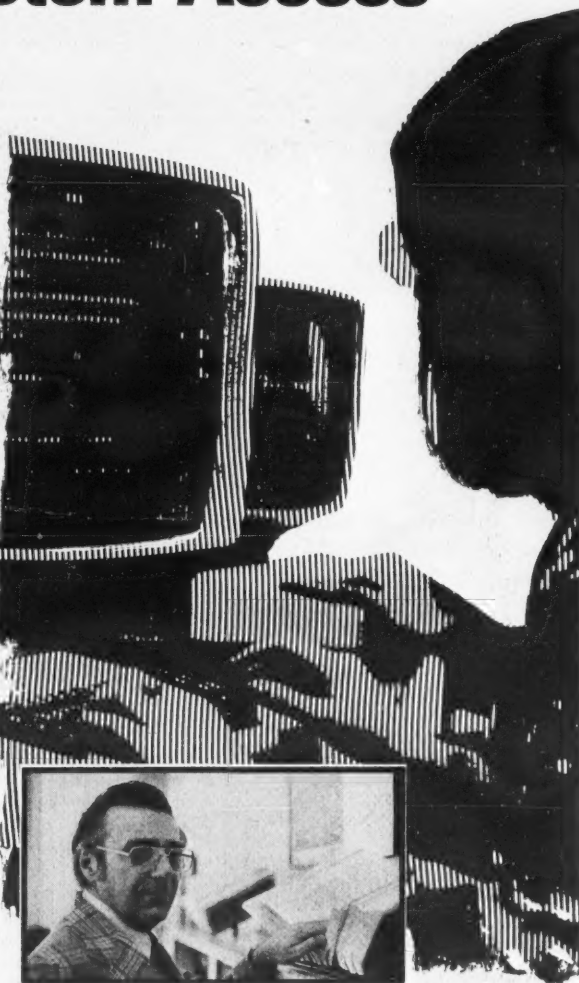
Two years ago, Life Insurance Company of Georgia installed ROSCOE, ADR's on-line conversational programming system. It was initially installed to speed computer program development, but Life of Georgia quickly found that ROSCOE also expanded direct computer access. Interactive procedures made the system easy to use without extensive training so that virtually any department could enter and update data through their own terminals. Self-prompting routines, using ROSPROC's, could direct users through even complex systems one step at a time. Information could be entered without keying-in locations or other detailed instructions, and corrections could be easily entered right over the old information, without re-keying whole data.

Today, nine ROSCOE equipped terminals are located throughout the company, giving many departments direct on-line access to 3400 operating programs. System specialists no longer wait in line to do a routine job.

Program development goes faster, too. With dataset recall, programmers call up the information they need, key-in required changes, and send it back again—without handling cards or paging through listings. "The greatest time savings comes from compiling COBOL programs," noted Earl Ryan. "ROSCOE asks the user what he wants to do and then tells him to enter the changes he wants to apply. As a result, turnaround time has been reduced at least 30%. And we have virtually eliminated JCL type errors."

"If we were to put our programmers back on the old keypunch system, we would have a real morale problem. It would be very difficult to take ROSCOE away now," Earl Ryan added.

Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.



"It would be very difficult to take ROSCOE away now . . ." Life of Georgia Technical Analyst, Earl Ryan, speaking about ADR's on-line conversational programming system.

For more information on what ADR software can do for you, call or write

APPLIED DATA RESEARCH

SOFTWARE PRODUCTS DIVISION

Route 206 Center, Princeton, N.J. 08540, Phone: 609-924-9100.

ADR software products: in use at over 5000 installations worldwide.

U.S. offices in Boston (617) 245-9540, Chicago (312) 694-2244, Cleveland (216) 228-0880, Houston (713) 526-3188, Los Angeles (213) 826-5527, New York (212) 986-4050, Princeton (609) 924-9100, Washington, D.C. (703) 281-2011.

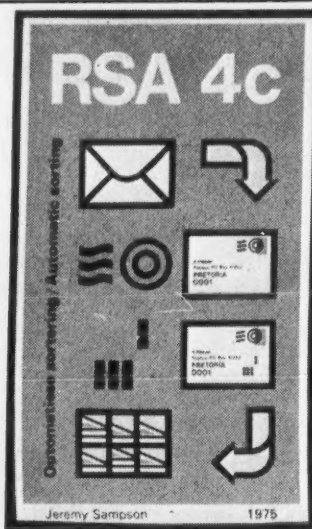
Foreign offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.



(1)



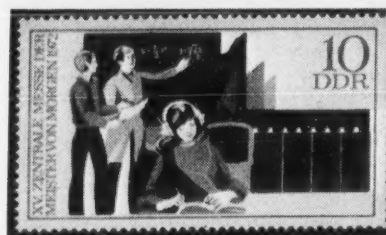
(5)



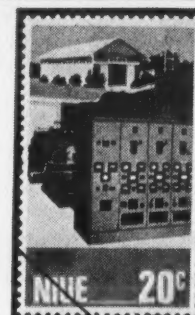
(2)



(3)



(6)



(4)

Stamp Collecting DP Style



(7)



(8)



They love me...they love me not...



trendata

610 Palomar Ave., P.O. Box 5060,
Sunnyvale, CA 94086 (408) 732-1790

AN APPLIED MAGNETICS COMPANY

Terminal manufacturers can be very fickle. Warm and tender when they write the order, most grow cold and unresponsive when you need service or repairs.

Trendata doesn't care for love-hate relationships. We're looking for something more meaningful, more fulfilling. So we offer you no-cost terminal evaluation, nationwide service by our representatives (not someone else's), one of the broadest range of terminals and peripherals available, and a wide variety of purchase, lease and rental programs.

And because our customer affection is boundless, we offer you all the supplies and accessories you need—ribbons, type elements, tape cassettes, copy holders, acoustic cabinets and forms stackers.

If you're having trouble communicating with your computer or computer terminal representative, call or write Trendata for a rendezvous.

By M.W. Martin

Special to Computerworld

Since March 1972 when the first article about "paper" computers appeared in *Computerworld*, DP postage stamps have become a full-fledged philatelic specialty with its own collectors' organization and its own publication aptly titled *EDPhilately*.

When the topic of computers on stamps first came up, one thought only of mechanics—hardware on stamps.

And while this design still remains the most important feature of a DP stamp, col-

lecting in the topic has expanded to include the many special event cancellations, meters used by DP companies and automated mail handling.

One new U.S. issue falls into the DP category—the 1975 double issued for banking and commerce in the U.S. and for the Centennial Convention of the American Bankers Association (1).

The twin stamps both show check-encoding numerals in computer script.

Stamps Issued Abroad

Abroad, there have been several issues from various parts of the world.

Automated mail handling was the subject of a 1975 stamp of South Africa (2), issued to publicize the use of its postal-code system.

Columbia's stamp of 1973 for the 50th anniversary of Comptroller-General's Office (3) depicts symbols of financial controls, including a punched tape and a reel.

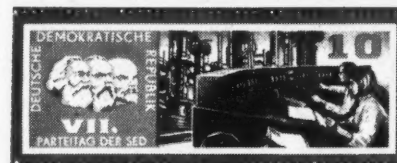
DP installations incidental to communications or industry appeared in six different sets of stamps.

A set of three stamps issued in 1976 by Niue to mark its achievements in the field of utility services includes a stamp showing the computer installation (4) of Niue's powerhouse at Tuila.

A 1973 series issued by Qatar for United Nations Day includes a stamp that shows



(10)



(11)

DP equipment used in telecommunications (5).

A set of two stamps issued in November 1972 by East Germany (6) shows computers used in education. The set was issued for the 15th Central Fair of Masters of Tomorrow.

The last computer stamp in this series (9) belongs to a long set of stamps issued in 1974 by Indonesia for the 17th anniversary of Pertamina State Oil Enterprise.

From Portugal, we have an all-DP set—graphs, printout and computer figures (7 and 8)—issued April 11, 1973, for the Productivity Conference held January 17-22, 1972.

Two older stamps are also of interest: a punched card from Thailand (10) issued to publicize the 1970 census and a computer center in an East German factory (11).

To learn more about *EDPhilately*, send a postcard to Martin, c/o Computerworld, 797 Washington St., Newton, Mass. 02160.

NCC Programming Contest Set

MONTVALE, N.J. — Programmers who qualify will have an opportunity to participate in a National Programming Contest at the National Computer Conference (NCC) in Dallas this summer.

This contest was developed in an effort to involve DP professionals more directly in conference activities, according to Dr. Portia Isaacson, Conference chairman.

To qualify, programmers must complete a sample problem. Entries will be reviewed, and based on the quality of their solutions

and about 240 people will be selected to participate in the contest.

No particular programming language will be required, and entrants will receive a list of languages, terminals and time-sharing services to be used in the contest.

The deadline for entering the qualifying round is March 1.

Official entry forms and sample problems may be obtained from Dr. C.E. Rodriguez, Computer Science Department, East Texas State University, Commerce, Texas 75428.

Web of IBM Ties to Carter Administration Expands

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. — The web of IBM connections within the Carter Administration grew last week as the new President was sworn in for a four-year term.

The Senate quickly confirmed the appointment of three IBM directors to Cabinet posts and several lower level offices

Bell Vague on Part In U.S. vs. IBM Suit

(Continued from Page 1)

any conflict.

President Jimmy Carter's choice for Attorney General said he would abide by his mentor's suggested two-year abstinence from private law practice following his tenure in Washington.

Although the Judiciary Committee's hearings were dominated by discussion of Bell's role as an Atlanta lawyer and then as a federal appeals court judge in the South's desegregation struggles, some of the Attorney General's thoughts on antitrust litigation were scattered throughout the proceedings.

Antitrust Laws Adequate

Bell contended the present antitrust laws are adequate to keep the U.S. free enterprise system healthy and to encourage competition.

"The weakness in the system is not the laws . . . The weakness in the system is that it is easy to beat the system. The court processes are so complicated, so slow, that once a case starts, it never seems to end. All you do is just stay in court," Bell said.

"As long as the court system is not adequate to finish a case within a reasonable time, it is difficult to enforce the antitrust laws," he added. Bell also urged the senators to "think of the expense and the waste of resources that are involved as well."

Judges who will keep a close watch on large antitrust cases are the key to speeding up such suits, Bell suggested.

Large cases should not be allowed to "flow through the courts" on their own, he contended. If a judge keeps tight control over discovery and sets the stage at which certain necessary legal tasks are to be accomplished, complex cases can be speeded up.

But he added that tight control of massive antitrust suits demands the close attention of already-overworked district court judges.

In this context, Bell said he might go to court to help speed complex cases along their way. "When there is a big case on, it would not be unusual for me . . . to appear in the case at some stage in order to see if we could expedite [it]."

Sen. James Abourezk (D-S. Dakota) asked Bell whether he would support legislation that would hold a company in violation of the antitrust laws once it passed a certain size.

Calling this "divestiture legislation," Abourezk said proposals for such a law had been before Congress in the past and promised their reappearance again this year.

Bell said he thought the idea was a good one and that he hadn't thought of it before. Such a concept would be "worth looking at and I would be glad to look at it," he told the senators.

Noting some companies are clearly monopolies and others are border-line cases, the Attorney General indicated the Justice Department might have a case against AT&T.

The case against the telephone company, in which it is urged that its manufacturing arm, Western Electric, be severed, "is the sort of thing that you can make a case for by showing that [the company] keeps other people out of the market."

"Once you keep people out of the market, then the consumer suffers because you do not get as good a product at a lower price."

went to people with IBM contacts.

In addition, it appears that another Cabinet member has closer connections with the IBM camp than previously thought.

In the Cabinet, IBM directors Cyrus Vance, the new Secretary of State, Harold Brown, heading the Defense department and Patricia Harris, Secretary of Housing and Urban Development, were all swiftly confirmed by the Senate last week.

Griffin Bell, who comes from the law firm of King and Spalding, which often represents IBM in Atlanta, was given the nod as Attorney General and is therefore in charge of the government's antitrust suit against IBM.

On the next echelon of federal officers, Warren Christopher, who has close IBM ties, landed the slot of Undersecretary of State. He will be in charge of day-to-day operation of the department.

Christopher was a top aide to Nicholas

deB. Katzenbach in the Justice Department; Katzenbach is now vice-president and general counsel at IBM.

Christopher comes from the law firm of O'Melvaney and Myers, which is representing IBM in several West Coast antitrust cases, and has testified for IBM by affidavit in the government's case against the firm.

For privacy advocates, Christopher's record will be particularly disturbing since he sponsored the Army's plan for massive collection and computerization of information on civilians during the '60s.

In addition to Christopher, sources here have indicated that F.A.O. Schwarz Jr., currently with Cravath Swaine and Moore, the law firm representing IBM in the government suit, is in line for a top Justice Department post, perhaps as Deputy Attorney General.

Schwarz, who indicated recently that the "would rather not talk about" whether he had been in touch with Bell about the post,

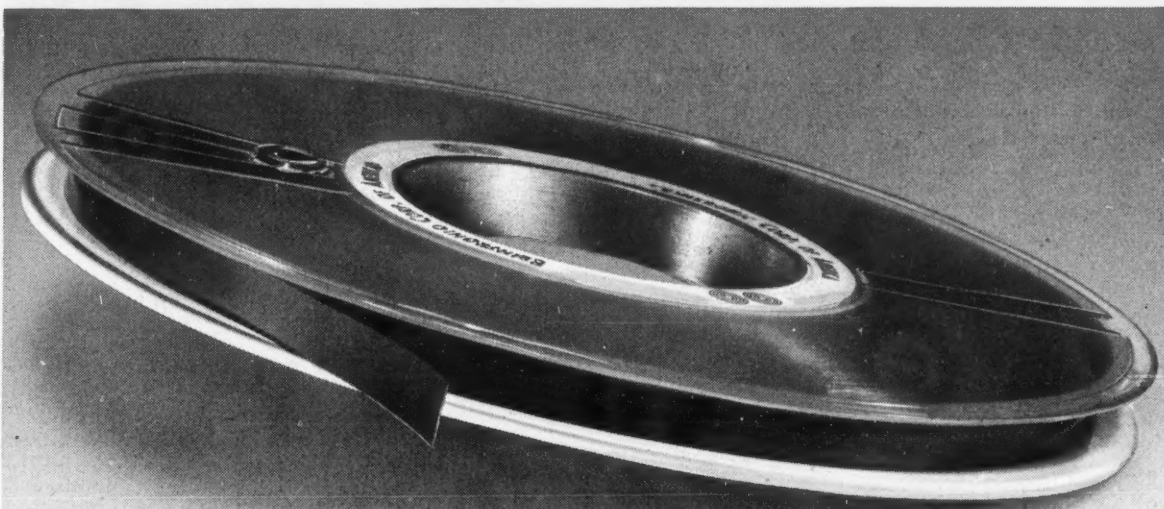
was No. 2 man on the IBM defense team behind Thomas D. Barr, until he left to head the Senate staff investigating the Central Intelligence Agency two years ago. He has since returned to the law firm.

Further, Juanita Kreps, confirmed as Secretary of Commerce last week, not only has ties to AT&T [CW, Jan. 10], but also to IBM.

As vice-president of Duke University, she worked closely with Duke President Terry Sanford, who is on the latest list of witnesses that IBM plans to call for its defense against the government charges of monopolization.

Charles Kirbo, Carter's closest adviser, who is also from the law firm of King and Spalding, told women's groups that Kreps had been suggested for the Commerce slot by IBM after Jane Cahill Pfeiffer, a former IBM vice-president, took herself out of running for the post, according to the *Privacy Journal*.

NOW...FOR A LIMITED TIME ONLY...



Take this valuable program FREE when you merely test the fabulous CA-SORT!

Yes, because we know how effective CA-SORT will be in your IBM 360/370 installation, we'll send you SYMDATA, our famed test data generator to use and keep just for taking ten minutes to install CA-SORT for a 14 day trial.

DP managers have been delighted to pay for SYMDATA because it takes the fuss and bother out of creating test data files—yet generates an accurate, comprehensive model file to your specifications virtually automatically.

SYMDATA is language independent eliminating the need to modify any source programs. It allows for 14 different field types and for up to 256 definitions per record. It even provides for up to 64 different record types per file.

HERE'S HOW TO GET SYMDATA ABSOLUTELY FREE OF COST!

Simply fill-in and mail the coupon (or telephone us collect). We'll immediately provide you further information on testing CA-SORT and receiving SYMDATA FREE.

Your CA-SORT test is almost effortless. It takes just ten minutes to install in any IBM environment, OS or DOS, and you'll save up to 30% of your sorting costs. It's so easy we don't even have to send a service representative unless you ask to.

You test CA-SORT on your problems, measure the savings in time and money, see for yourself the improvement in throughput. In any event, receive a royalty free license for SYMDATA as a "thank you" gift (subject to a \$50 handling charge and our standard license agreement).

We know you'll save with CA-SORT . . . that's why this generous FREE gift offer. BUT THIS IS A LIMITED TIME OFFER. So write or telephone today.

COMPUTER ASSOCIATES, INC.

655 Madison Avenue, New York, N.Y. 10021

U.S. OFFICES: New York, Georgia, Illinois, Michigan, California, District of Columbia, Texas, Connecticut.

WORLDWIDE OFFICES: Australia, Austria, Belgium, Denmark, France, Germany, Holland, Italy, Japan, United Kingdom.

FILL-IN AND MAIL TODAY

Computer Associates

655 Madison Avenue, New York, N.Y. 10021

CW-1/27

YES—Provide me with further information on testing CA-SORT and the FREE SYMDATA program.

Name (Please Print)

Title

Company

Address

City State Zip

Telephone (Please give area code)

Computer Model System

OR—TELEPHONE US COLLECT FOR FASTER SERVICE:
(212) - 355-3333

COMPUTER ASSOCIATES

All Vendors Free to Make Gear for Any Software: IBM

By Ronald A. Frank
Of the CW Staff

NEWTON, Mass. — Although IBM will not support its operating system software on other vendors' machines, it has made a point of emphasizing the freedom other manufacturers have to produce equipment that works with other manufacturers' software [CW, Jan. 10].

In a brief filed as part of its antitrust suit with the Justice Department in 1975, IBM said: "Manufacturers typically develop software for their own systems, but the fact that this must be done is no more a barrier to entry than the fact that manufacturers must also design the hardware features of the product which they hope to market."

"If a manufacturer wishes to design machines which can use the software written for another machine, it certainly can."

The brief went on to cite examples where independent vendors had designed systems that could run IBM software.

This list included the Xerox Corp. Sigma 7 which reportedly runs Fortran and Cobol programs "installed on IBM computers"; the Digital Scientific Corp. Meta 4 which had microprogramming in read-only

memory "to execute programs which operate on the IBM 1130 and 1800; and the General Automation, Inc. 18/30 which "can replace an IBM 1130 and perform tasks like inventory control, payroll, job

scheduling, as well as scientific and engineering computation."

The brief did not specify how this IBM software, running on non-IBM systems, would be supported.

Calcomp vs. IBM Jury Seems to Have a Shadow

(Continued from Page 1)

suspensions. Prior to the brief holiday recess, he wished "both juries" a "Merry Christmas."

Assuming these people are a shadow jury, the party hiring them does not want its identity known for fear the people will lose their impartiality. Calcomp Chairman Lester Kilpatrick has vehemently denied Calcomp hired them or engaged a firm to hire them. An IBM spokesman also said IBM has not hired them.

But what of IBM's attorneys? David Boies of Cravath Swaine & Moore said his firm

did not hire them and to his knowledge has not hired any kind of research firm that might have done so.

But he also said that since the value of a shadow jury depends on its not knowing the identity of its employer, he would not acknowledge that his firm hired a shadow jury even if it had.

Jack Brown of Brown and Bain said his firm did not directly or indirectly hire people to act as a shadow jury.

But there are more parties interested in Calcomp vs. IBM than those participating. Memorex is the next plaintiff in line to try

its antitrust case against IBM. A company spokesman said Memorex had not hired a shadow jury.

However, he pleaded attorney-client privilege when asked if Memorex is retaining a firm that specializes in research on jury reactions and aids in jury selection.

For the rest of the West Coast cases, IBM's law firm is O'Melveny & Myers of Los Angeles. A spokesman for that firm said he could not comment on whether it has either directly or indirectly hired a shadow jury, also pleading attorney-client privilege.

But, he said, the fact that he would not comment should not be construed one way or the other.

Transamerica Corp. attorneys flatly denied they or their client hired the people because of the expense involved.

While observers consider it unlikely that any individual plaintiff hired a shadow jury, Transamerica attorneys said the plaintiffs in the upcoming cases against IBM did not combine resources for such an action.

The Computer and Communications Industry Association also denied hiring the shadow jurors.

One theory is that some members of the shadow jury have college educations and on that basis provide a control group for the actual jury.

IBM objected to the lack of variety in that jury's economic status and, by implication, lack of education.

Another possibility is that the group was selected by a firm that researches juries and was assigned to this particular case without any interest or retainer by the parties in the case.

Or, perhaps, they're simply interested in watching an antitrust case. But they sure picked a lengthy one.

FCC Postpones Start Of Dataspeed Tariff

(Continued from Page 1)

not be offered by the telephone company since it violated the FCC findings in the first Computer Inquiry.

Under those rules, telephone companies are prohibited from offering DP devices or services except through wholly separate subsidiaries.

Shortly before the end of 1976, the FCC reversed the bureau chief and said the interstate tariff could go into effect pending the outcome of the second Computer Inquiry. In the text of that decision, released early this month, the commission said the characteristics of the Dataspeed 40/4 were different than the characteristics of a CPU and hence should not be considered as a DP service even though the terminal requires interaction with a CPU to operate.

Opponents of the FCC decision have argued the CRT operates in binary synchronous mode and can be clustered around a minicomputer controller. Both of these are features of DP terminal systems and take the Model 4 out of the realm of being strictly a communications device, making it a DP device.

Although the controversy over the interstate tariff for the Dataspeed 40/4 continues, intrastate tariffs have been approved in all areas served by Bell System companies.

While customers who operate under the intrastate tariffs were advised by local Bell System phone companies that the Model 4 is not to be used for transmission of data across state lines, however, industry sources agreed it is virtually impossible to guarantee that interstate usage is totally excluded.

A FOUR-IN-ONE PROGRAM

of Seminars and Symposia

Now learn what the experts think about Computer Networks, Data Communications, Hospital Information Systems, and Health Care Administration, and learn how these same experts have solved their own application problems.

COMPUTER NETWORKS DATA COMMUNICATIONS HOSPITAL INFORMATION SYSTEMS HEALTH CARE ADMINISTRATION

Date/Time	Advanced Computer Network Seminar		Advanced Data Communications Workshop		Advanced Hospital Information Systems Seminar		Advanced Health Care Administration Symposium	
	Session	Topics	Session	Topics	Session	Topics	Session	Topics
Monday Feb. 28, 1977 8:45-12:00	Concepts & Applications	Network Concepts Application Requirements Government/Commercial/ Industrial Solutions	Planning	Overview Definitions and Concepts System Planning	Design Concept	Design Review Role of Medical Information Systems in HIS State-of-the-Art HIS/MIS Review	Industry Profile	Major Government and Com- Programs Pending Legislation Legislative Impact of National Health Insurance
Monday Feb. 28, 1977 1:45-5:00	Planning & Implement- ation	RFP/Preparation Proposal Evaluation Government Commercial	Data Com- munications Systems	Hardware & Equipments Circuit Concepts Software Carriers & Services	Data Collec- tion and Analysis	Data Collection Instruments Computer Systems Config- uration Quantification of Data Collection	Claim Pro- cessing Techniques	Enrollment Utilization Review Provider Relations Beneficiary Services
Tuesday Mar. 1, 1977 8:45-12:00	Computer Networking	Common Carriers Host Computers Distributed Processing Terminals	Design and Procure- ment	Design Methodology RFP Preparation Proposal Evaluations Acceptance	Systems Architecture	Equipment Profile Centralized vs. Decentralized design Case Studies Software Structure	Major Pro- grams	MEDICAID MEDICARE FEP CHAMPUS Commercial
Tuesday Mar. 1, 1977 1:45-5:00	Simulation, Evaluation, Measure- ment	Host Simulation Network Simulation Hardware Monitor Technical Control	Operations and Mainte- nance	Management Technical Control Fault Isolation Security	Software Design	HIS Operating Systems MIS Operating Systems Support Packages Data Base Requirements	Data Pro- cessing Systems	In-House EDS OSI HAS
Wednesday Mar. 2, 1977 8:45-11:00	Case Studies and Technology	Government Commercial Private Long Range Forecast	System De- sign II	Introduction to Networks Case Studies Questions and Answers	Implementa- tion and Planning	Planning Strategy Implementation Plans Cost Benefits Feasibility Study Case Studies	Future Trends in Claim Pro- cessing	Regionalization Expanded Role of EDP

28 February — 2 March 1977
Deauville Hotel, Miami Beach, Florida

Sponsor:  Systems Architects, Inc.

Co-Sponsor:  Health Systems International

Make your reservations now: Call Ms. Dorothy O'Connell at (617) 961-4840 or use the registration form below:

Name _____
Title _____
Company _____
Division _____
Street _____ Tel. _____
City _____ State _____ Zip _____

Mail completed form to:

Ms. Dorothy O'Connell
Systems Architects, Inc.
Thomas Patton Drive
Randolph, MA 02368
(617) 961-4840

The Four-in-One Program will be held at the Deauville Hotel, Miami Beach, Florida from February 28, 1977 through March 2, 1977. Registration fee of \$395.00 includes breakfasts and luncheons, as well as all course material. Team registrations are available for \$300.00.

FIRST NATIONAL HEALTH INSURANCE CONFERENCE

A major conference addressing National Health Insurance, its prospects, scope, timing, administration and impact, and its relationship to the major government and commercial programs currently in force will be held concurrently with the Four-in-One Program. Plan now to join those who establish policy, and those who implement and administer health care and health insurance programs, at this first industry-wide conference to address National Health Insurance in all its implications.

Please register me for the program checked below:

- ☐ Computer Networks
☐ Data Communications
☐ Hospital Information Systems
☐ Health Care Administration
28 February — 2 March 1977
Deauville Hotel, Miami Beach, FL
☐ National Health Insurance Conf.

Please use additional sheet
for names and titles of team
registrants.

Move Created Hardships for Lessors

Memos Show IBM Set 370 Prices to Encourage Rentals

By Molly Upton
Of the CW Staff

LOS ANGELES — When the IBM 370 series was introduced, prices were set to encourage renting and discourage purchasing, according to memos introduced here last week in the California Computer Products, Inc. (Calcomp) vs. IBM antitrust trial.

This move created difficulties for leasing companies that had made a successful business of purchasing and then leasing IBM 360 systems, the memos indicated.

IBM did this by increasing the lease/purchase ratio — increasing the number of months it took for rental charges to equal the purchase price, the documents showed.

One document introduced, a memo from T.C. Papes Jr., explained why. According to Papes, IBM was losing two percentage points of future revenue for each month a lessor's system exceeded its estimated multiplier life.

To correct this imbalance of shipments, Papes, who in 1967 was director of finance for the Data Processing Group, suggested that IBM should consider lower rental fees, and perhaps eliminate the purchase option, if it couldn't raise purchase prices.

Careful Calculations

IBM carefully calculated what the rate of return would be and how long it would take lessors to recoup their investments with different multipliers, documents showed.

On June 5, 1970, just prior to the approval of the 370 pricing announcement, A.M. Aldrich, IBM's manager of financial analysis, indicated to John R. Opel, then senior vice-president, that "on a return-on-revenue basis after taxes, the economy will harm the leasing companies by 6% and the IBM actions will harm the leasing companies by an additional 11%."

Using the effective multiplier of 53, which ultimately was approved, Aldrich assumed lessors would initially charge 88% of IBM's rental rate, as they had with 360s.

If lessors raised their prices to 95% of IBM's rental for the first three years, they could get into the black, he indicated.

Purchase Drop Predicted

One 1968 memo predicted a drop in lessors' purchases of 370s compared with 360s.

The 370 announcement "will undoubtedly place leasing companies in a precarious position in 1970-72 when most of their current customers' contracts will be subject to renegotiation," the memo predicted.

"Discounting of rental prices below the break-even point, coupled with a heavy displacement" of 360s because of 370 ship-

ments, "will cause the weak companies to become unprofitable."

"The more established companies" are expected to purchase new systems "on a selected basis in order to satisfy their accounts; however, they will be operating at a disadvantage compared with today's environment based on the assumptions which underlie the forecast: higher purchase multipliers and a general increase in maintenance prices for NS [370] products."

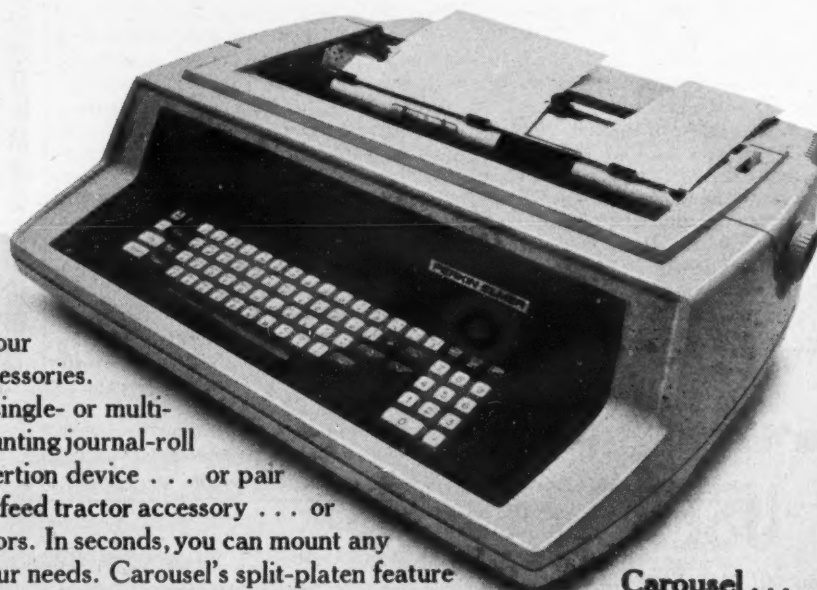
IBM recognized that lessors were responsible for contributing to its increased ratio of sales compared with leases. But it also saw that lessors as a group represented a force larger than any mainframe competitor, a memo from Vice-President Warren C. Hume to the Management Review Committee in September 1967 indicated.

Rate of Payback

Multiplier	System	Return	Years
40	360/65 (512K)	14.6%	5.8
44	360/30 (32K)	12.4%	6.3
46	360/40 (128K)	11.4%	6.6
52	370	6.7%	8.3

Chart adapted from 1968 IBM figures shows effect of 370's multiplier on the length of time required by lessors to recoup purchase price.

Only Perkin-Elmer gives you two terminals for the price of one.



Mix or match any two of our unique forms handling accessories.

Combine journaling with single- or multi-part forms printing by mounting journal-roll holder and front forms-insertion device . . . or pair front-insertion with a pin-feed tractor accessory . . . or snap on two pin-feed tractors. In seconds, you can mount any combination that meets your needs. Carousel's split-platen feature then lets you feed, advance, tabulate, and print each form, sheet, or tape independently, under operator or computer control.

Carousel . . .
more than a printer

Privacy Hearings Set On Private Eyes

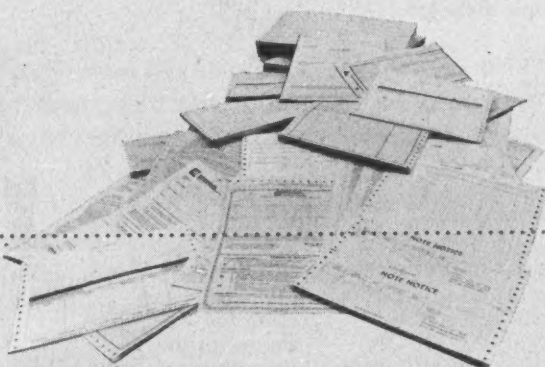
WASHINGTON, D.C. — The Privacy Protection Study Commission will hold a public hearing on the activities of private investigation firms on Jan. 26 in Room 1318 of the Dirksen Senate Office Building here.

The commission will focus on the services provided by private investigation firms in connection with employment and promotion decisions as well as the impact such investigations have on the individual subject involved.

The commission is interested in such things as investigative methods and techniques, how records are kept and the content, format and manner of delivery of reports to clients.

The exchange of information between law enforcement agencies and private investigation firms in the course of this process will also be examined.

Those interested in participating should contact the commission immediately at 2120 L St. N.W., Washington, D.C. 20506.



PERKIN-ELMER | TERMINALS DATA SYSTEMS | DIVISION

Randolph Park West, Route 10 & Emery Avenue
Randolph, NJ 07801 201 366-5550 TWX 710-987-7913

Overseas, call: 44895-52441 Usbridge, UK
887-1000 Sydney, Australia
416-677-8990 Mississauga, Ontario, Canada

Yes. I want the terminal that can handle my forms.

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

Estimated No. of Units _____

Interested in handling: ☐ ledger cards ☐ front forms insertion
☐ multipart continuous forms ☐ automatic feeding and stacking
documents and certificates ☐ independent journaling and forms
printing ☐ alternate type fonts (Specify) _____

IBM Additions Turn System 32 Into Sophisticated Tool

(Continued from Page 1)

requires the Fortran IV compiler, the spokesman noted.

JAS/32 is a project control tool written in Basic Assembler to help managers schedule the time and resources required to complete complex operations, according to the spokesman. Utilizing Critical Path Method logic, it could be used by DP managers for planning their own internal activities, IBM suggested.

The enhanced SCP is provided free to System 32 users. The program products, planned for May availability, will carry license fees of \$75/mo for Fortran, \$50/mo each for SL-Math and the Statistical

System and \$57/mo for JAS/32.

On the hardware side of things, the Control Storage Increment is a block of 4K words of additional storage required for the execution of Fortran object programs. It can be purchased for \$1,350 or rented for \$35/mo.

Fortran symbols are provided on all models of the System 32 equipped with serial printers, IBM said. On models with line printers, the symbols are provided by a 64-character Ebcidic print belt or by a newly introduced 48-character belt which can be purchased for \$170 or specified as the standard system print belt, the spokesman explained.

The System 32 itself was introduced two years ago as the base for turnkey solutions to the needs of the unsophisticated user. Whole systems of programs were ready or under development for specific target groups. New Industry Application Programs (IAP) are still being announced from time to time.

During 1976, IBM broke away from the strictly IAP approach and introduced several generalized accounting packages that could be used by a variety of industries. But the essential idea was the same: Plug it in and use it — don't bother writing your own code.

Also last year, there were indications

some IBM branch offices were providing potential System 32 users with the names of software houses that might be able to create programs not then available from IBM.

Right from the original announcement of the 32, users could get a Basic Assembler with which they could do their own thing, but IBM never emphasized that facility as it did the IAPs. Although RPG was made available later, the stress was still away from in-house development work.

Now with the introduction of the Fortran compiler and related hardware and software, the system appears to be equipped to support at least the basic needs of scientifically and engineering-oriented problem solvers.

Even the nonprogramming personnel that were original System 32 targets may benefit from these products. With a compiler available for their machines, they should be able to directly use many of the hundreds of Fortran programs now on the market or in the public domain.

Despite DP, Coast Guard Can't Stop All Oil Spills

(Continued from Page 1)

from 1,185 cases in fiscal year 1965 to 1,918 in fiscal year 1975," Rear Admiral Anthony J. Fugaro told the House Committee on Merchant Marine and Fisheries' Subcommittee on Coast Guard and Navigation in September.

The reported losses to vessels, cargo and property from these casualties rose \$70 million to \$103 million between those years; 50 people died and another 39 were seriously injured, Fugaro said.

These figures do not include shore damage or the costs of spilled oil cleanup.

The Coast Guard presently has one computer-based vessel-tracking system and is planning two others for inland waterways, according to a spokesman for the Coast Guard's Vessel Traffic Service (VTS).

The operational system is located in Houston; a second is being installed at the VTS in New Orleans, he said.

A third is being planned to track ships in the bays and rivers around Manhattan Island by mid-1978, he added.

The Houston-Galveston VTS operation, equipped with a computer-based information and display system, is expected to prevent 38% of the collisions and 25% of all casualties, according to Fugaro.

"It is estimated that the operation of the

New York VTS will prevent one-half of the collisions, about one-third of all casualties and produce direct monetary benefits of \$2.4 million annually, Fugaro stated.

In New York alone, "about 80 collisions, ramblings and groundings occur annually, causing an average of six pollution incidents and \$9 million in direct damages to vessels, property and cargo," Fugaro said.

The New York system, he added, will rely on computer-based storage, processing and vessel information display for traffic management functions.

Motorola Corp. has subcontracted with Ocean Data Systems for development of the New York system, which will incorporate Modular Computer Products, Inc. (Mod-comp) CRTs.

The device will show a digitized outline with major navigational aids and channel outlines of major waterways around the city, according to the VTS spokesman.

In Houston, a Lockheed Information Systems computer system shows a synthesized display of the Houston ship channel. The system will signal the display operator in time to notify a vessel of a pending collision, the spokesman said.

The New Orleans VTS will utilize a CRT made by Burroughs Corp. similar to those used in aircraft avoidance systems.

Computer systems and CRT terminals are used in VTS traffic monitoring because they cut down on personnel and can keep information files on all vessels calling in, including cargo, destination, route, size, name and other factors affecting the vessel's safe navigation, the spokesman explained.

However, the Coast Guard "can't predict

a collision situation between two ships with the present or planned systems. We can only rely on the accuracy of a ship's reported location to predict accidents," he said. "We can't legislate competence."

erisa?

If the personal penalties for management violation of the Employee Retirement Income Security Act of 1974 have you worried, then take heart.

Wang has software, designed, installed and running, safeguarding the pensions of more than one million workers and the careers of their managers.

For more on ERISA, call Joe Nestor (617) 851-4111, Wang Laboratories, Tewksbury, MA. 01876. In California, call Carl Tarascio (714) 631-0138.

WANG

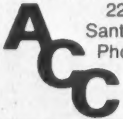
LSI-11 USERS

Add UNIBUS Compatibility with the UA/11C UNIBUS Adapter

- Quad-width board mounts in DEC's PDP-11/03 backplane and allows attachment of UNIBUS memory and DMA or programmed peripherals to the LSI-11 Processor System.
- Peripherals on either bus may access peripherals or memory on both buses, including DMA transfers.
- Software Transparent — Allows operation of devices supported by DEC's RT11-V02C operating system.
- Allows use of standard UNIBUS peripherals including:
 - RK05/RK11 Cartridge Disk
 - PC11 high speed paper tape reader/punch
 - RJ03 fixed head disk
 - TM11 magnetic tape
 - DH11 asynchronous line multiplexer (not supported by RT11)

UA/11C UNIBUS Adapter\$650
Delivery from stock

ASSOCIATED COMPUTER CONSULTANTS
228 East Cota Street
Santa Barbara, CA 93101
Phone: (805) 963-8801



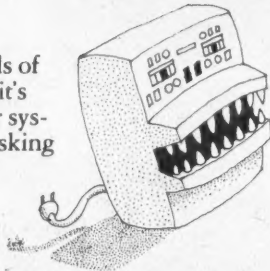
Tame the king of the DBMS jungle.

Every day you face the perils of the DBMS jungle. Because it's taking a big bite out of your system resources, people are asking tough questions:

- Why is our system's response time so high?
- What level of service is being provided and at what cost?
- How can we equitably distribute costs among users/applications?
- Can we maintain or improve service as volumes increase?
- Where are the system problems/bottlenecks?

CONTROL/IMS provides the answers.

If your IMS system is a cub you need information to control its growth. If it's already running wild you need information to bring it under control.



CONTROL/IMS is:

- An installation management tool that gives you the information needed to control IMS.
- A financial management tool that allows you to accurately develop the cost of providing services to each user.
- A performance analysis tool that

permits you to analyze and improve the IMS system.

- A planning tool that helps you develop accurate predictions for the future based on the trends and patterns of the past.

Find out how you can be king of the IMS jungle. Contact Boole & Babbage, Inc., 850 Stewart Drive, Sunnyvale, California 94086, (408) 735-9550. Outside California dial toll free 800-538-1872.

Boole & Babbage

I want to be King of the IMS Jungle. Send me information on CONTROL/IMS immediately.

Name _____ Title _____
Company _____
Address _____ City _____
State _____ Zip _____ Phone _____

Covers Both Public, Private Sectors

Germans Pass Privacy Law With Age Limit on Data

By G. Russell Pipe

Special to Computerworld

BONN, W. Germany — A Federal Data Protection Law was enacted here late last year that blocks the use of data if it is found to be inaccurate or more than five years old.

Of all 18 countries having privacy protection activities, only West Germany has made a special point to "end the life of data."

The law, which becomes effective Jan. 1, 1978, applies to both manual and automated personal data systems in the federal government, the Laender — or states — and all private enterprises.

Although the law contains most of the principles of fair information practices found in the U.S. Privacy Act of 1974, the Laender may exempt themselves from the federal law if they enact comparable state-level legislation.

Under the law, all collection, storage, transmission, modification and erasure of personal data is illegal unless organizations — governmental and private — comply with provisions of the act, have obtained authorization for their systems under another appropriate law or have secured the consent of the individuals whose records are maintained.

Affects Third Parties

Although the law goes into considerable detail and is a product of four years of compromise and modification, organizations maintaining personal record systems may find it difficult to be sure they are fully complying with the technical and organizational requirements.

Users of automated systems or those that process or divulge personal information to third parties must comply with all provisions of the act. Those keeping strictly manual files for internal use are required only to adopt appropriate security measures and prudent management procedures.

Like the U.S. Privacy Act, the German law requires public notice of the existence and character of systems, right of inspection and correction or erasure of erroneous information by data subjects.

Giving individuals the authority to inspect and correct records is a significant government precedent in the recordkeeping tradition of Germany.

Data processors have expressed concern over the law's technical and organizational requirements. These oblige users to prevent unauthorized physical access to the processing facilities; to establish controls over data linkage; to set up technical measures against improper input, access, communications, transport, organization and tampering with stored data; and to assure these practices will be observed by third-party processors.

In applying these regulations, the law suggests the "current state of the art and organization" should serve as an important source of guidance.

The government is authorized to issue orders, on approval of the upper house of the German parliament, the Bundesrat, representing the states, to adjust this section of the act.

Two significant loopholes are provided in the law, however: Protection shall be appropriate "to the type of personal data to be protected" and "measures shall be required only if the cost involved is reasonable in relation to the desired level of protection."

Penalties for violating the law involve fines of up to \$20,000 and two years' imprisonment for some offenses.

An independent federal data protection commissioner, operating within the Ministry of Interior, will be appointed to ensure compliance with the law by all federal offices and establishments. Each of

the Laender is expected to create a similar position and associations of private industries are to name ombudsmen to successfully implement the act.

All companies or associations that process data automatically and employ more than five persons for this purpose must appoint a reliable "data protection representative" with specialized knowledge who will report directly to the director or legally appointed manager of the organization.

Personal data brought into Germany from other countries and data transmitted abroad will be covered under the terms of the law. How to determine whether DP outside Germany is accorded necessary protection — especially in countries having no similar privacy legislation — may complicate the task of multinational processors

and users.

The Federal Data Protection Law was hotly controversial at several stages of its three-year consideration, partly because of the type of rules which might be imposed on the private sector, the provisions for institutional supervision and the minimum requirements placed on the Laender.

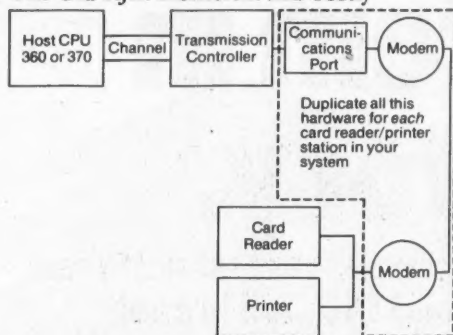
An early political decision that a privacy statute precede enactment of a universal personal identification number for all Germans and resident aliens (favored by the highly automated Laender administrations) may have been a key incentive to the law's passage in the session of the German parliament which expired in December.

Pipe, presently an international consultant who spends most of his time in Europe, worked on draft versions of the U.S. Privacy Act as a congressional staff member.

RJE goes local; effectiveness goes up.

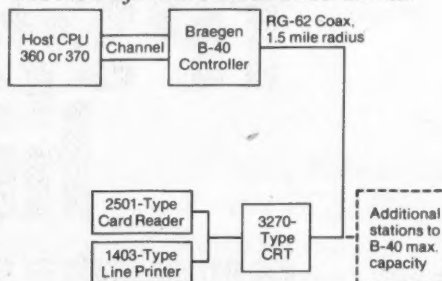
Local Job Entry (LJE) is Braegen's inspired solution to the many drawbacks of conventional Remote Job Entry systems. LJE performs exactly like computer-room peripherals in conjunction with an IBM 360 or 370 System, but lets you locate your card readers and printers as far as a mile and a half away from your CPU.

The Old RJE: Inefficient and Costly



Between your remote station and your host computer, even in the same building, there's a transmission controller, a modem, telephone lines, and another modem. If the lines are good, and the modems are fast enough, it works just fine. It also costs a bundle.

The New LJE: Efficient and Economical



A single Braegen B-40 controller attaches to your 360 or 370 channel. Then RG-62 coax runs out to every remote station, as far away as a mile and a half from the mainframe. At the other end, you connect whatever you need. Card readers, line printers, 3270-type CRT terminals, the whole works. It always works, and it saves a bundle.

And These Exclusive Advantages

Braegen's LJE concept offers a lot more than financial advantages. With LJE, there's full overlap of reading and printing. There's a "hot" card reader. The printer is a chain train type. All of your I/O devices run at full rated speed. And you're through forever with remote job entry software 270X/370X ports, modems, and telephone line complications.

LJE Is Available Right Now

Braegen LJE installations are at work throughout the United States, with user history reports available. When you learn how much others have saved with LJE, you'll want to upgrade your system, too. Call Larry Edwards at (408) 255-4200, or write The Braegen Corporation, 20740 Valley Green Drive, Cupertino, CA 95016.

Calendar

Feb. 22-24, Newark, Del. — **1977 Winter Meeting of the Association for the Development of Computer-Based Instructional Systems (Adcis)**. Contact: Fred Hofstetter, Music Department, University of Delaware, Newark, Del. 19711.

Feb. 27-March 3, Houston — **DP Auditing Conference**, sponsored by the Bank Administration Institute (BAI). Contact: Jeffrey E. Kingan, The Meeting Services Division, BAI, P.O. Box 500, Park Ridge, Ill. 60068.

Feb. 28-March 2, Miami Beach, Fla. — **Advanced Data Communications Workshop**. Contact: Dorothy O'Connell, Systems Architects, Inc., Thomas Patton Drive, Randolph, Mass. 02368.



BRAEGEN

Data Bank Being Tested to Help Diagnose Birth Defects

By Ann Dooley
Of the CW Staff

BOSTON — A data bank to help doctors around the world diagnose birth defects is currently being tested here.

Birth defects affect 15 million people in the U.S. alone and present a major health problem, according to the March of Dimes National Foundation, which is sponsoring and gathering information for the data bank in cooperation with MIT and the Tufts-New England Medical Center.

Some birth defects are so rare the typical physician will not encounter them in his lifetime. And the set of symptoms for one abnormality might be so similar to another that the physician would not know which to treat.

Statistics and symptoms of the 1,400 known kinds of birth defects are being fed into an IBM 370/168. When the data bank is implemented next spring, physicians will be able to dial into the computer from a

hospital or office terminal at any time of the day or night.

A physician with a diagnostic problem will key the observed symptoms into the computer, and the system will narrow down the possibilities through a series of increasingly specific questions.

"The beauty of this process is that it compels the physician to examine areas which he may have missed," according to Sidney Gellis, chairman of the Tufts University Medical School's Pediatrics Department.

Questions and answers will continue until the system has received enough symptoms, signs and test results to suggest one or more probable diagnoses. At that point it is up to the doctor to decide what treatment to use.

"The purpose of the Birth Defects Information System is to assist the doctor, not to tell the doctor what to do. Only he can decide that," John Donovan said. Donovan is an associate professor at MIT's Sloan School of Management.

Once the symptoms are associated with a certain disease, the physician can identify hidden or extenuating problems that might occur. He can also predict the patient's health outlook and the risk that future siblings or offspring will be similarly affected.

An early warning system will also be an important part of the effort. Until now, doctors have had no knowledge of the kinds or frequency of birth defects diagnosed

elsewhere.

Evidence will be available which will indicate the geographic areas, specific drugs, viruses or chemical contaminants which might be hazardous to a fetus.

With such a widely accessible centralized system, the drug thalidomide might have been recognized more quickly as a cause of birth defects, according to Louis Gutentag, technical assistant at the Sloan School.

Medical Data to Form 'Textbook'

DURHAM, N.C. — A data bank here will eventually be the most detailed and comprehensive source of information for physicians, according to doctors at Duke University Medical Center.

The "computerized textbook" stores diagnostic and treatment information so one patient's symptoms, treatment and response to treatment can be compared

with thousands of other patients with similar case histories.

From this information, the doctor can make a more efficient and accurate judgment and decision on patient care, according to Dr. Robert Rosati, a Duke cardiologist.

This kind of medical record system differs from the normal "textbook" because information can be instantly retrieved.

The system is now on a Xerox Sigma 5, but will be converted to a Digital Equipment Corp. PDP-11/45 or 11/70 in September.

"The Sigma 5 wasn't bought to do what we're doing and couldn't handle the expansions we're planning," Rosati explained.

Input to the data base has concentrated mainly on heart problems so far; there are already 6,000 heart patient records processed.

Announcing Com-plete. The most complete TP System in history.

No other system gives you all these advantages.
It's CICS, IMS/DC, and TSO...all in one!

1. Conversational Transaction Processing. Anyone can enter or retrieve data from a Com-plete terminal. Response time? Faster than any other system!

2. Interactive Program Development. Programmers can now develop and test applications on-line. The result? A 15% to 30% increase in programmer productivity.

3. Operating Environment Maintenance and Control.

Systems programmers can maintain your operating system—and operators can control it—directly from a Com-plete terminal. That's still another time and money-saver.

And there's more!

Com-plete does all of this...but, compared with other systems, uses *less than half* the main memory and processing time. And customers say that it's amazingly reliable,

even from the day of installation.

Is security a concern? Com-plete offers more than any other system, for both on-line and batch.

Special introductory offer.

Com-plete will cost considerably more in 6 months than it does now. So contact us soon. We'd like to show you how Com-plete will pay for itself again and again in cost savings.

Just a few more details.

Com-plete was developed by Software ag, the people who introduced Adabas. It can be used on an IBM 360/370 or an Amdahl computer. It's now available for VS1 and MFT operating systems...and, soon, for MVT, VS2, and MVS.

Call or write today.

The number? 703-860-5050. The coupon? Below.

software ag
OF NORTH AMERICA, INC.

Reston International Center, 11800 Sunrise Valley Drive, Reston, Virginia 22091

Name _____ State _____ Zip _____
Company _____ Phone _____
Street _____ Type of computer _____
City _____ Operating system _____



**Washington
is where it's at!**

Want to know how other datacomm users and consultants solve problems? Come to DataComm 77, Sheraton Park Hotel, Washington, D.C., March 9-11, 1977. Leading users will be on hand to brief you on ways they put datacomm to work. Here are some of the speakers:



Dr. M. Muntner, Asst. Commissioner, ADTS, GSA Datacomm in Government

S.J. Pace, Data Processing Mgr., Group Hospitalization Inc.
L.A. Humphrey, Mgr. of Systems & Computing, Alyeska Service Pipeline Co.
C.C. Harding, V.P., Automated Customer Services, State Street Bank & Trust Co.
Lt. Col. J.B. Smith, Deputy Head, Education Research Computer Center, USAF Academy.
C.C. Johnson, Project Mgr., TDRSS, NASA.
W.M. Malone, Branch Chief, Systems Development, Air Force Systems Command
T.J. Steichen, Program Mgr., White House Office of Telecommunications Policy.
T.D. Miller, Pres., Government Sales Consultants, Inc.
H.G. Reiche, Dir., Office of ADP & Telecommunications Management, Dept. of the Interior.
Dr. A. Phillips, Dean, School of Public & Urban Policy, University of Pennsylvania.
J. Aicher, Mgr., Data Systems Security, Suntech, Inc.
R.L. House, Dir. of Support Services, Uni-Coil Corp.
W.M. Murray, Sen. Program Administrator, Data Security, IBM DPD.
Dr. M. Muntner, Asst. Commissioner, Automated Data and Telecommunications Services, General Service Administration.

And, there are many more. Including representatives of Government agencies who will fill you in on legislative and regulatory matters every datacomm user should know about. For more information, write DataComm 77, 60 Austin Street, Newtonville, MA 02160. Or call our Toll-Free Hot Line 1-800-225-3232. (In Mass. and Canada call 617-964-4550 collect).

DataComm 77 is organized by the Association of Data Communications Users, Auerbach Publishers, Computer & Communications Industry Association, Canadian Data Systems, Computer Decisions, Computerworld, DataComm User, Datamation, and Infosystems.

**DataComm 777
Where the action is!**

Does More Than Tell Where to Drill

DP System Ensures All's Well at Amoco Oil Wells

By Ann Dooley
Of the CW Staff

TULSA, Okla. — Oil drilling is a high-pressured, costly operation in which computers are rapidly being implemented to avoid critical mistakes.

Amoco Production Co., the oil exploration arm of Standard Oil Company-Indiana, "drills more wells in the U.S. than any other company and has the highest suc-

cess rate among the major oil companies," according to Bill Randall, research supervisor of drilling applications at Amoco.

Amoco analyzes where to drill for oil and gas using a system of five IBM 370/168s hooked together. Data comes from past drill jobs and existing wells.

But the computer's role doesn't end once the drilling sites are selected, Randall said. Drilling and rigging cost Amoco about

\$5,000 per day, so drillers depend on the computer to keep well drilling at optimum efficiency.

When something goes wrong or a change in drilling procedure is needed, oil drillers using portable terminals "call" Amoco's Honeywell 6600 in Cleveland via the General Electric time-sharing network.

For example, if changes in mud properties occur or adjustments are needed in rotary speed or mud pump pressures, the system will be asked to analyze the data and suggest alternative measures.

The system has resulted in savings that permit more wells to be drilled than would otherwise be possible.

Amoco has 35 computerized drilling assistance programs that provide data on equipment evaluation, well control and safety and the best, most efficient and cheapest

ways to run a rig.

The programs indicate, for instance, what force and what drill to put on a rig. If a well starts to "blow out," the operator can obtain information on how to gain control of the well from indicators such as the depth and speed of the drill or the type of mud.

The assistance programs were developed from large data banks containing location and geologic formation data on more than a million wells, drill bit records on 130,000 bit runs, detailed cost information on approximately 5,000 wells and the daily drilling reports on 800 completed wells plus years of laboratory testing.

Amoco has licensed 53 other companies to use its program facilities. "The concept is still experimental and we get an exchange of information which eventually helps us cut drilling costs," Randall said.

Agency Uses Simulation to Find, Put Value on Undersea Oil Sites

By a CW Staff Writer

RESTON, Va. — There's only one way to produce oil and that's to make a hole in the ground, according to one oil driller.

But to determine where that hole should be drilled, oil companies and the U.S. Geological Survey put their money on the Monte Carlo simulation method.

The Survey's Geological Inquiries Group, whose responsibility it is to lease the ocean bottoms to oil companies, locates and evaluates the possible oil deposits based on seismic and geophysical readings, according to Gayle Oglesby, the group's chief of marine evaluation.

Once deposits have been located, the Survey uses the Monte Carlo simulation method to discover the probable production value of a tract of land and determine an acceptable bid price for a tract of ocean bottom, Oglesby explained.

Seismic Readings

Deposits are discovered by bouncing vibrations off the ocean bottom from a boat on the surface. The seismic readings received are recorded on a small on-board terminal, transferred to tape and then converted to an histographic printout which gives a three-dimensional picture of the earth's structure.

The type of soil structure shown on the printout gives clues on where oil and gas deposits might be located.

To determine a dollar amount for a tract, the computer, an IBM 370/155, has been programmed with 500 different variables. These variables are randomly selected on a run which is repeated 500 different ways, Oglesby said.

The Monte Carlo method, while not foolproof, has proven successful, he added.

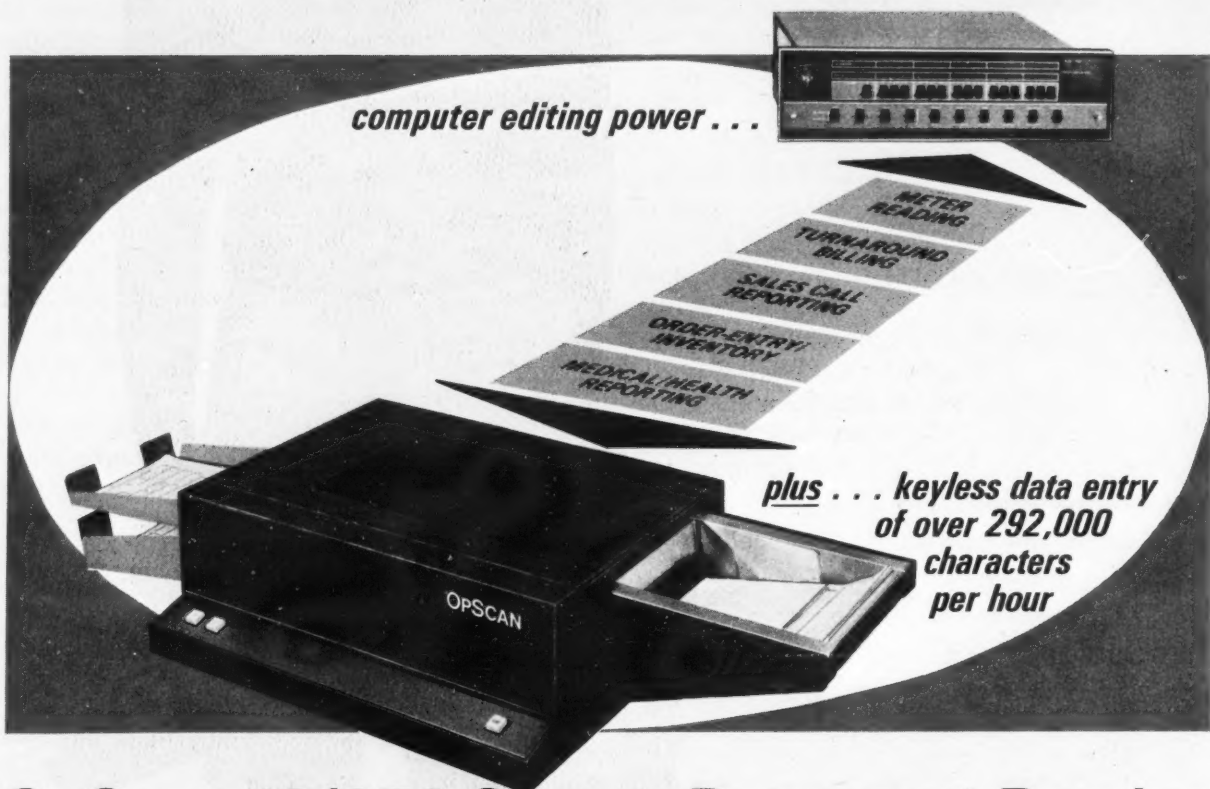
Some oil men in Houston, however, call this approach "Swag" for "Scientific Wild-Ass Guess." The fact is, one oil man said, "nobody knows" where oil is located.

Nevertheless, the Survey believes this to be the most accurate method for determining fair market value when the oil companies come in with their proposed bids.

Oil companies like Amoco Production Co. use the same simulation method in determining the odds of producing oil in a

tract at market value and obtaining a return on their investment.

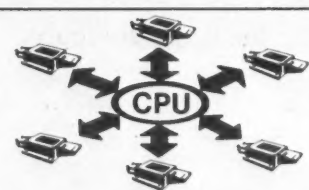
the under-\$10,000* buy that can break a \$100,000 data entry bottleneck



OpScan 12/270 Source Document Reader ... automatically enters all types of application data

- **SOURCE DATA ENTRY** ... means your source document is your entry data. No transcribing, no keying, no duplicating. Just scan it ... file it. And with the 12/270 OMR System, you receive full automation with:
- **DISCRIMINATE READING** ... for unexcelled accuracy of alpha/numeric input.
- **COMPUTER-CONTROLLED** ... for total control of input accuracy at the front end, through:
On-line Editing ... eliminating post-input edit routines.
On-line Document Sorting ... eliminating manual searches for error documents.
- **AUTOMATIC FEED** ... documents of variable sizes and formats accepted without manual adjustment.
- **RE-TRANSMIT/RE-READ WITHOUT RE-FEED** ... eliminates manual intervention when verifying data and/or transmission.
- **LOW OPERATING COST** ... no need for special operators or constant attendance.

*OEM Discounts are available



The OpScan 12/270 System is also ideal for applications where data is to be generated from multiple sites. Mini, micro and CPU interface flexibility provides users with an economical way to capture, convert, format, and verify data ... on-line ... and thus to process only fully-edited data.

OP-101

OPSCAN HAS THE LARGEST APPLICATIONS REFERENCE LIBRARY IN THE WORLD ... FREE OF CHARGE

Over 15,000 examples of current applications are available for your reference and/or adaptation.

OPTICAL SCANNING CORPORATION

Pioneering Source Data Entry Since 1960

P.O. BOX 40, NEWTOWN, PA. 18940 (215) 968-4611

Worldwide installations—Nationwide sales, service, analysts, forms. Sales: Atlanta • Boston • Chicago • Cincinnati • Cleveland • Columbus • Dallas • Denver • Detroit • Los Angeles • Orlando • Philadelphia • Memphis • New Orleans • New York • San Francisco • Seattle • St. Louis • Washington, D.C. • CANADA: Montreal • Toronto.

Documentation Standards for Computer Systems

\$20.
INDEXED
239 pp.
1976

ISBN
0-89321-102-8

A practical reference volume which shows how to fully document a computer system. Simplifies documentation through sample formats of key documents. Step-by-step development of a system through six key stages. Adopted by the State of Delaware for statewide implementation.

The TECHNOLOGY PRESS, Inc.
Box 125-CWC
Fairfax Station, VA 22039

This is not what we're looking for.

Beaten Brows — How much abuse can one man take?

Receding Hairline — Anxiety causes him to pull it out in clumps.

Tunnel Vision — From being forced to work within narrow limits.

Crooked Nose — What would you expect when it's always out of joint?

Sore Throat — From yessing too many people, too many times.

Stoop Shoulders — From carrying the weight of corporate policies.

Ulcers — Sell out your principles, eat out your gut.

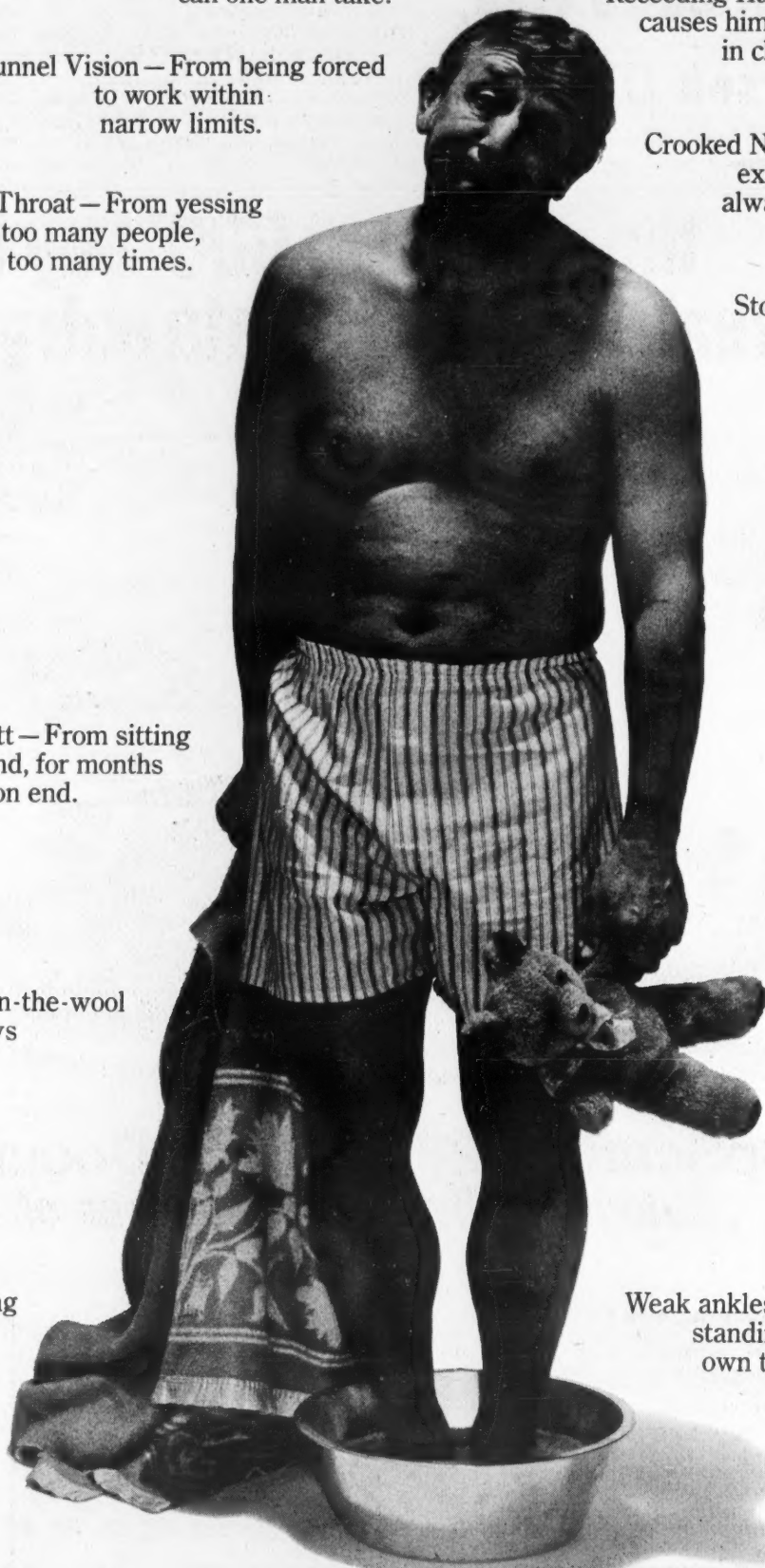
Flabby butt — From sitting on his end, for months on end.

Security Blanket — A dyed-in-the-wool friend he can always depend on.

Teddy Bear — With a sympathetic ear and a shoulder to cry on.

Bow Legs — From straddling the corporate fence.

Weak ankles — From never standing on his own two feet.



Delicate Feet — From treading oh-so-lightly on others' opinions.

(The Stifled Corporate Employee, 1977. As observed by ComputerAutomation.)

This is what we're looking for.

Customer Support Reps for the Commercial Systems Division of ComputerAutomation. Twenty more of them, for right now.

We make SyFA, the most advanced distributed data processing system in the world today. And we're growing so fast it sometimes surprises even us. But we're not going to let that growth force us into filling positions indiscriminately.

Because no matter how fast — or how big — we grow, we know that the person is more important than the position. And without the right person, the position is meaningless.

We're looking for twenty "right" people.

People who think like we do.

Who have had enough experience with computers — in college or on the job — to know basically what they're all about.

Who have a college degree, but not necessarily in computer science. Related fields, such as business or math suit us just fine. (We've even got one Customer Support Rep working for us now who majored in, of all things, Slavic languages.)

Who haven't lost to big business that special spark they had back in college.

Who believe that experience isn't necessarily all it's cracked up to be. And think hard work and creativity can easily replace it.

Who refuse to knuckle under to the atmosphere of an oppressive, giant corporation.

Who have taken a long, hard look at their current company and realized that there's more to life than chasing a gold watch on a stick.

Who think that what could have been, still can be.

The Job.

You'll provide technical support for our current customers.

You'll determine and show prospects how our system can fit their plans and solve their specific problems.

You'll talk to management. And to DP personnel.

You'll report to one of our Customer Support Centers in major cities throughout the U.S.

You'll travel out of town up to a week at a time.

You'll even do some programming on occasion.

The Immediate Rewards.

For the more mercenary among you, the starting salary is \$12,000 per year. Or more.

Depending on your experience, your enthusiasm, and your ability to convince the boss you're worth as much as you think you are.

We'll also toss in a liberal monthly car allowance. And cover your gasoline bills.

And more important, the Potential Rewards.

The sky, as they say, is the limit.

The Commercial Systems Division of ComputerAutomation is a rapidly growing division of a rapidly growing company.

The people we're looking for will expect, in fact, demand to grow with it.

In less than two years, you'll be dissatisfied with this job and want more challenges, more responsibilities. Justifiably so.

You'll have a chance to move into management. Or directly into sales.

It's simple. We want to throttle our competition. Not our employees.



ComputerAutomation

Commercial Systems Division

18651 Von Karman, Irvine, California 92713

Dear Sir:

ComputerAutomation sounds like they understand my problems. Here's a little information about myself. Please call if you like the sounds of me as much as I like the sounds of you.

Name _____ Phone Number _____

Address _____

City _____ State _____ Zip _____

Years working with computers in college _____ professionally _____

College _____

Degree _____ Year graduated _____

Major _____ GPA _____

Equal Opportunity Employer M/F

ComputerAutomation also has immediate openings for customer service reps, design/development engineers, programmers, systems analysts, technical writers, and similar opportunities in sales, marketing, manufacturing, finance, and general administration.

Editorials

Detering Disasters

A disaster such as the spill of millions of gallons of oil from the foundering Argo Merchant invariably leads to demands for stringent controls that will head off such catastrophes.

Several legislators have called for vessel traffic management systems that would monitor the progress of environmentally dangerous cargoes along the coastal waterways and at sea.

Much of the data in such a system would be computerized, and current sightings and observations would be compared to the expected positions of such vessels as recorded in a data base.

There have also been suggestions that records on "dangerous cargo violations" could easily be checked on vessels appearing to violate acceptable navigational practices.

Such vessel-tracking systems would be similar to the motor vehicle systems now in widespread use. Ships with questionable histories could be more easily identified and monitored. Perhaps potential disaster situations could also be identified and preventive actions taken.

In all of these proposed systems, the computer would provide the key link in supplying vital information and analyzing available data in a timely manner.

The introduction of DP would by no means assure the establishment of foolproof systems. But for those who understand its capabilities, the computer would provide an important tool as long as it is programmed in a logical manner.

Several government agencies are already using DP simulation techniques to predict the direction and impact of oil spills. This type of risk analysis has helped to anticipate the impact of these disasters.

The next step will be the use of the computer to prevent such events.

The computer can play a vital role as long as we don't ask for more than an intelligent machine can deliver.

Fair or Foul?

When do corporate actions and policies become detrimental and even damaging to an industry?

And how far can a dominant corporation go in attempting to obtain special considerations or exert undue influence?

These are, of course, difficult questions that may not have clear-cut answers. But attempts to deal with these questions have led to antitrust and other legal proceedings.

In a recent *N.Y. Times* article, William Safire traced the involvement of President Carter's designated appointees with IBM.

"Never in American political history has one corporation so completely dominated the top levels of any administration," Safire wrote.

"Is it wrong for a corporation to try to people an administration with its policymakers? Of course not — unless it gets too successful," he concluded.

But what is "too successful" and who will decide the threshold?

In the meantime, examples keep cropping up.

On Pages 3, 7 and 39 of this issue are some examples of these corporate practices that have come under scrutiny. These articles take on added significance in the light of recent events.

In this context, they deserve careful consideration because they affect all segments of the DP industry — vendors and users alike.



'It's All Yours.'

Letters to the Editor

Lord Should Consult the User Before Criticizing the System

I have read Kenniston Lord's articles in your excellent publication for many months. Each time I have emerged from the experience with the vague feeling that he was ignorant of his topic. However, I had to wait for his article in the Jan. 10 issue ["Must FAA System Standards Be Purchased With Blood?"] to be certain.

I appeal to you: Stop wasting good trees and ink on his ignorance.

Data Past

Five Years Ago
Jan. 26, 1972

WASHINGTON, D.C. — Sen. Sam J. Ervin Jr. (D-N.C.), chairman of the Constitutional Rights Subcommittee, told Congress it had "an urgent duty to enact laws to control the rapid development of large interlinking computer data systems in the Federal Government which may affect the rights of citizens who deal with government."

In announcing the publication of the first volume of testimony taken by the subcommittee during its 1971 hearings on federal data banks, Ervin asked Congress to "enact laws to prevent future abuse of the Army's power to investigate law-abiding civilians" and called the testimony "an incriminating record of inequities in the executive branch of the Federal Government which have threatened the privacy and First Amendment rights of all Americans."

WALTHAM, Mass. — Honeywell Information Systems (HIS) introduced the Series 2000 line of medium-scale computers to complement its Series 200 family.

Eight Years Ago
Jan. 29, 1969

NEW YORK — The U.S. Justice Department filed an antitrust suit against IBM asking the Federal District Court here to "end IBM's monopolizing practices and to require any necessary divestiture."

The Justice Department asked that IBM be required to price, sell and lease separately its computer systems, programming know-how and other support.

Attorney General Ramsey Clark said the civil suit alleged that IBM pursued manufacturing and marketing policies that denied other manufacturers an adequate opportunity to compete effectively.

The last government antitrust suit against IBM ended in 1956 with the signing of a consent decree under which IBM set up its service bureau operations as a wholly owned subsidiary.

As do most immature systems analyst/designers, he rushed into conclusions without understanding the problem or the proper role of the system he criticized.

To state things rather loosely, in the federal air traffic control system, control and decisions reside in the cockpit, not on the ground. Controllers (a misnomer, by the way) are "advisers"; they recommend and coordinate, they do not command.

When the entire computer-aided Federal Aviation Administration (FAA) goes down, there are still well understood and published procedures that both pilots and controllers know and follow. Their training is devoted to understanding those procedures (and their underlying logic) thoroughly.

While some hardship and delays may be imposed through lack of computer support, no lives are placed in jeopardy.

Perhaps Lord should consult a user of the system before he criticizes it. This system works well although, like most, it could be improved.

Carol Anne Ogden

Alexandria, Va.

Solution Rests in Real World

In his Dec. 27-Jan. 3 column, Alan Taylor asked for solutions to the problem of controlling unsolicited mailings of negotiable instruments to existing bank customers.

The solution is a simple one: Mail the material stamped with "address correction requested." When this service is requested, the U.S. Postal Service will forward the mail, if at all possible, and provide notification of the new address.

Yes, the solution requires sticking one's head outside of the DP world and finding out what is happening in the real world.

But, as Taylor would be the first to agree, DP does not exist in a vacuum.

Jerry Gitomer

Olney, Md.

Cobol Equivalent Corrected

In his letter [CW, Dec. 6], Larry Kintisch pointed out a mistake in M. Curtis Stordahl's article [CW, Nov. 15]. However, the solution he offered was incorrect.

Stordahl was attempting to convert PL/I's DO WHILE C to Cobol and incorrectly came up with PERFORM NEST-4 UNTIL C. This statement is the inverse of the PL/I structure.

Since the IF statement and the UNTIL clause have the same conditions, NEST-4 will never be executed. The IF statement will not allow the PERFORM to be executed unless NOT C is true, but then the PERFORM's UNTIL condition will be met and control will be passed to the next sentence.

The correct Cobol structure would be simply PERFORM NEST-4 UNTIL NOT C.

Sam C. Theis

Baton Rouge, La.

'Bionic Redemption' Can Return DP Power to the User

By Jack Stone

Special to Computerworld

"Bionics," according to *Webster's New World Dictionary*, is "the science of designing instruments or systems modeled after living organisms."

As I reflect on the state of the DP community at the start of the new year, I keep coming back to one thought: The human malaise that permeates computer centers can be attributed to the bionic or mechanistic character of much that happens in the centers.

It's a little late, but I suggest the community's resolution for 1977 be to redeem ourselves from our pagan, technological ways and redirect ourselves to the design and implementation of systems that are truly beneficial to the users, supported by trained and motivated personnel and managed by competent supervisors who build DP effectiveness through their leadership style.

Let me recount the "bionic litany":

Technical activity in the typical computer center is characterized by overweening fascination with the intricacies of the latest and greatest hardware/software configurations.

It appears almost irrelevant that meaningful systems are eventually derived from the technical establishment, seeming to interfere with the interminable debates over such minutiae as dating algorithms.

Negative Responses

Are our highly revered technical giants really turning out meaningful systems? I think the centers are doing a rotten job and I think this is the general opinion of most people associated with them.

In nearly all my DP management

seminars and public lectures, I poll the audience. A typical question: "Do you judge your center to be doing a quality job in turning out systems that are really needed, properly implemented and cost-justified?"

I don't feel that question is particularly improper since it pertains to what is supposed to be the primary mission of the center, its "raison d'être."

I've been polling this way for years and audiences have consistently answered with no more than a 5% to 10% "yes" vote, except for one recent occasion when 16% were positive in their response.

The Human Connection

It would appear the typical systems analyst/programmer/manager team perceives a DP system to be a flowchart, a Cobol source deck and a telephone call to production control to say, "It's coming across the counter."

'Bionic Redemption'

In contrast to that, "bionic redemption" implies significant efforts that must be applied to ensure human involvement in system development, including user participation from the project's inception; documentation of user needs and system specifications; and management controls over quality of technical work, budgets and schedules.

It would also include proper systems testing and user acceptance tasks; adequate briefings and run-time information for operations; and postinstallation audit review by management, including an analysis of the effectiveness and efficiency

of the support personnel.

Another example of our dissolute ways is the near-total absence of installation-backed efforts to build human communications, leadership and management skills in the DP technical departments.

Where are the training programs that teach the technical people to be better people?

We are not given to eleemosynary pursuits, but people who can communicate better, who can demonstrate greater sensitivity toward their colleagues and user/customers, who can accept a self-

is required?" I have never received more than two "yes" votes in any of my audiences.

According to comments I have received as well as my own observations, first-line supervisory leadership (as opposed to administration) is essentially nonexistent.

The supervisor role is merely one that distributes the work, monitors performance, checks quality and sends up management reports with no particular concern about the human relationships involved in the effort or what it takes to get people to want to work more productively or why technical personnel are not committed to the organization.

Some people have referred to technical supervisors as "bionic administrators." Their lack of knowledge and/or concern for the human aspects of the job only gives them the appearance, but not the substance, of human managers.

The New Mood

Perhaps I am caught up with the new mood in Washington, slowly changing from scathing skepticism to human hopefulness.

In spite of serious questions about overall performance in our community, I believe the potential exists for computer people to find the time, the resources and, more than anything, the desire to apply their enormously creative talents to study and learn and to succeed in making the "human connection" to computer systems.

By analogy with the new Administration's desire to return the political power of the bureaucratic machinery to the people, a DP community movement toward "bionic redemption" will surely return computer power to the user.

DP Makes It Practical to Evade Information Controls

John, one of my brothers, is a doctor. I remember talking to him in the '50s about some of the problems that insurance investigators caused him.

At that time, John told me he was frequently approached by them in attempts to get access to the medical records of his patients — sufficiently frequently, in fact, for him to evolve a standard approach for handling them.

John's approach was quite simple. He refused to meet with them except during surgery hours. Then, when the surgery waiting room was full, he would invite the investigator in. The investigator would state who he was and who he was investigating. This would normally be done as quietly as possible.

John would pull the records from the cabinet behind his chair, silently check the time of the insurance application and the patient's death. Then he would rise to his full height, somewhat over six feet two, open the door, position himself in front of it and raise his voice so that everyone heard him.

He would proceed to explain the request that had been made and identify the investigator's employer. He would then come out with some statement like:

"And you, in order to avoid paying out an insurance policy, are trying to get me to hand over my records to you, just because you sometimes pay me to examine people before insurance is granted."

"Now you want my private records on one of my patients who you didn't have examined just so you can avoid paying out when the poor guy has died. You can go to hell!"

"My patient's records are private, and XXX Insurance Corp. knows that all medical records are private and should stop

this foul way of doing business — trying to avoid covering the very risks that they tout as being dangerous.

"Now get out — and don't come back!"

Needless to say, the people in the waiting room heard every word. And, needless to say, their medical records were safeguarded.

Technique of the '60s

In the '60s, the technique was to store computerized medical records from various areas: hospitals, local doctors, social workers, even from pharmacies. And opinions from court officers, school officials and so forth were added to the files.

The computer melded the information to provide some sort of profile — assuming that everything reported was true and that everything about the person was being reported by someone.

The output was supposed to yield recommendations that this person should be given birth control "advice," that person should be made a ward-of-state, etc.

Now, there is nothing wrong in suggesting the review of medical records or in computerizing them as such. But the key problem was that the firm concerned saw nothing wrong with using a real person's medical records gathered by various U.S. government agencies to illustrate how this could be done.

In fact, a whole community of patient records and the identification of the community and all the patients were there on display for days. And no one saw anything wrong with it.

The firm had never taken the Hippocratic Oath. To it, the records were magnetized shots — not people, as they were to John.

Davis and Her Alibi

Now, in the '70s, the results of this failure to appreciate the problem of the computer have borne the expected, or easily anticipatable, fruit.

The recent National Bureau of Standards (NBS) report, "Computers, Health Records and Citizen's Rights," reported that

medical records, for both proper and improper reasons, were being kept from the data subjects themselves — but not from just about anyone else.

Commenting on the report, Dr. Ruth Davis of the NBS claimed the problem of medical privacy had existed all the time and said computers "had simply made existing problems more conspicuous and irritating."

Well, that's nice. But it's really "exoneration by faint damning."

Sure, the problem of divulging medical data has been there for centuries; indeed, for over two thousand years the problem has been recognized. So far, Davis is correct.

What she failed to point out, however, is that not only was it recognized, but there were adequate controls on the situation. The Hippocratic Oath was, and still is, the major such control.

It was the existence of this oath that allowed John to publicly blast even insurance companies that paid for some examinations with impunity. They knew that if challenged they could not justify their approaches.

In the '50s, this control, while not complete, was adequate.

Computers Bypass Controls

What the computers have done — something Davis is pushing under the rug — is to bypass the controls that have been handling the problem fairly successfully for millennia.

The immediate computer crime is against the Hippocratic Oath control, not directly against the privacy of records themselves.

Computer systems, with their ability to copy and their inability to sort out reliable and necessary information from garbage and arrogance, have put these records into hands of those who have not taken and do not care about the Hippocratic Oath or any other controls.

This computer-caused evasion of controls is more than just "conspicuous and irritating."

What Davis really seemed to be complain-

ing about is the media's ability to bring the news of computer abuses to the masses, no matter who wants to bust them up.

Computers, in this case as in many others, have genuinely caused a problem that didn't exist before, but Davis ignored it. Computers have made it practical to routinely evade the medical privacy controls. That is what Davis so facetiously and dangerously ignored.

Computer Alibis

Medicine, of course, is not the only area where computers are outflanking information controls. Bank records, for instance, are open routinely to government officials now.

The direct authority for this action is an act of Congress. But if computers had not made it practical for such records to be easily reviewed, it is doubtful whether anyone would have thought of passing the law through Congress.

Credit records and scholastic records also suffer from the same erosion of confidentiality — not because some existing problem has become conspicuous or irritating, but because existing controls have been outflanked.

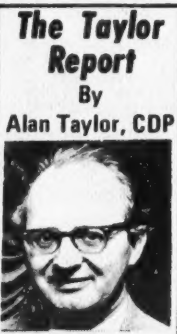
Davis should, of course, reconsider her comments (which really simply show offenders against various ethical actions an easy way to alibi themselves when caught).

More than that, DP professionals should not be taken in by the comfortable words she — or anyone else — uses.

Computer abuses are real and are caused by computers. Treacle words like Davis' comments won't cover these abuses, which need to be treated seriously if the computer revolution isn't to be followed by a burn-the-computer counterrevolution.

And I don't think even Davis wants that. I know I don't and I don't think the profession wants it either.

© Copyright 1977 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of *Computerworld*.



Third-Party Switcher May Be Best EFT Net Service

By Gale N. Turner

Special to Computerworld

With the increasingly rapid growth of electronic funds transfer (EFT), the question looming is how best to implement network switching, whether through federal or private facilities.

A service organization or consortium may be the answer.

It has been suggested that the automated clearinghouse (ACH) network and an integrated national point-of-sale (POS) system are "natural monopolies" because of implied economies of scale.

If this can indeed be proven as a Keynesian axiom, then let us quickly default to the Federal Government and proceed with other levels of development. One need only give a sideways glance at a mailbox, however, to be reminded of the massive bureaucracy required.

Adapso Position

The Association of Data Processing Service Organizations (Adapso) maintains that federal agencies should be prevented from entering into three elements of EFT — entry, delivery or processing — until the private sector has an opportunity to foster such systems in a competitive environment with minimal government intervention or regulation.

Adapso has long supported a "maximum separation doctrine" which prevents the improper spillover of power from one market to another. If any federal agency operates an EFT network, the private sector of the DP service industry will, accordingly, be precluded from competing.

The private sector has the present ability to create and operate competitive EFT systems in a manner consistent with the public's interest in privacy, security and economy.

The real question in this issue is whether the financial intermediaries are willing to operate with a set of standards which places the Federal Government or the Federal Reserve Bank squarely between them and their customers. I doubt that will happen.

A possible solution to this dilemma is for the regulatory officials, in conjunction with ACH members, to seek out, on a bid basis, the neutrality and efficiency of a service organization or consortium thereof for the network switching.

This would tend to place the Federal Reserve's administered ACHs and the private ones on a more common ground.

Successful Networks

Successful applications of transaction networks have included service organizations such as AT&T's Transaction Network Service, Dial Financial Corp.'s switching network for Iowa Banks, Texas Instruments' money transfer system, Credit Systems, Inc.'s switching network for St. Louis and contiguous states and National Data Corp.'s credit switching network.

The service organization could also provide EFT services to small financial institutions which, by lack of size and scope of operations, do not have the ability to offer these services to their customers. As geographic boundaries continue to melt away, this

area will be of increasing concern to bank regulatory officials, not to mention the banks affected.

Let us hope the regulatory officials provide a wholesome arena of competitive restraint. This may require the wisdom of a Solomon.

Service development of a new form is currently taking place at the corporate level as treasurers discover better ways to employ cash management techniques through bank balance reporting. In essence, a complete cash control system would be at one's fingertips.

This service best demonstrates two inherent traits of the third party. Users benefit by the efficiency in receiving a consolidated report. Neutrality is maintained

National Data Corp., General Electric, Rapidata and Automatic Data Processing.

At the consumer level, POS or check guarantee networks have

tions have been an integral part of the nation's financial community. As the need for specialization increases in the EFT arena, third-party services will be increasingly required.

We, as others, look to the legislative and regulatory officials for setting the electronic climate of the future. All we ask and expect is the opportunity to compete under the concept of free enterprise that has made this nation great.

Turner is manager of bank services at National Data Corp. in Atlanta.

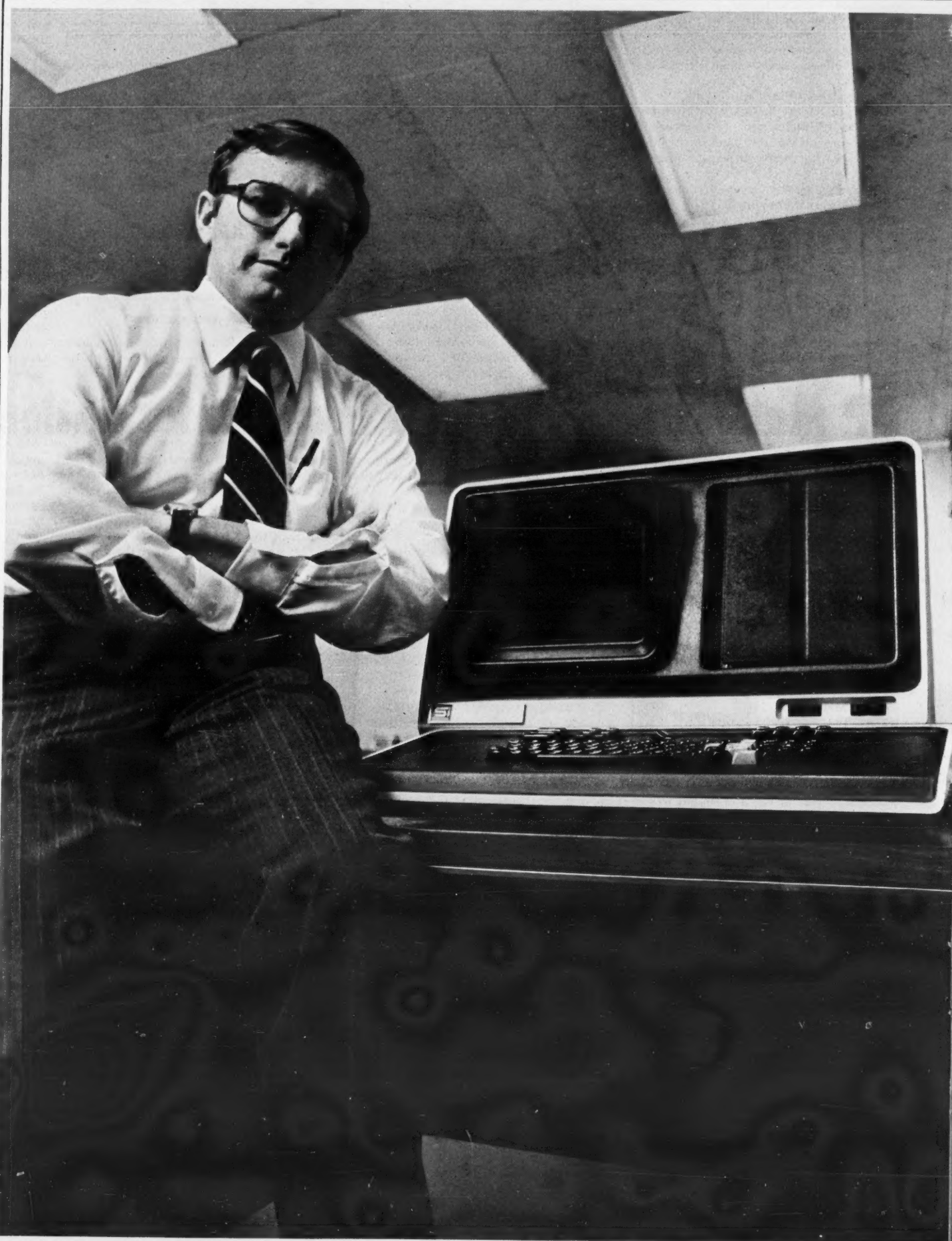
Reader Commentary

by a noninterested party handling sensitive banking information and economies of scale are at work to keep costs low.

Service organizations offering balance reporting now include

been established by Control Data Corp. (Telemoney), TRW, American Express and National Data as well as several private-label credit card issuers.

Third-party service organiza-



Computer Science Grads Face Dilemma

DP Industry's Youth No Excuse for Its Hiring Practices

By Andrew Robinson

Special to Computerworld

I am currently employed as an IBM computer operator with the option of promotion to a position as an applications programmer.

I wish to remain a computer operator — but not lose the financial gains afforded an applications programmer. What should I do?

Neither lacking in ambition nor the competency to learn a new skill, I am currently an under-

graduate computer science major studying systems programming at the University of California at Los Angeles. For this reason, my interest in computer operations stems from a desire to work as closely as possible to the operating system.

When I inquired at other companies about openings for computer operators, however, I found these positions available only to those being promoted from

within. Many companies are inclined to promote non-DP people — such as mailroom clerks or truckdrivers — to junior com-

puter operator positions. However, many companies will only take on new employees who have years of experience on their particular systems.

Reader Commentary

puter operator positions.

I have no objections to hiring entry-level people (those with no DP training) to DP positions.

This means that if someone with three years' experience as an RCA Spectra 70 computer operator applied for a job requiring three

years' experience as an IBM 370/155 computer operator, he would not get the job.

By virtue of "seniority" within a company, however, someone with no DP training could be promoted to that position.

To me, this illustrates that hiring practices in the DP industry have not kept pace with DP technology.

The following are just a few of the personnel practices in the industry:

- No university teaches actual "computer operations" sufficient enough to award an individual certification comparable to industry requirements.

As a result, a student could obtain a degree in computer science and be considered a professional without ever having IPLed a system, witnessed a disk head crash or seen a hard-copy log.

- In DP departments, many computer operators with no programming training are promoted to applications programmers. However, many an aspiring university student of computer science familiar with all the languages has been denied these opportunities because he lacks "actual programming experience."

'Dumb Operators'

- Many programmers and systems analysts look down on operations staffs as "dumb operators."

But when the system crashes, competent operators are second only to system programmers in value.

- Many average computer operators have become DP managers and systems analysts while senior computer operator "diehards," devoted to their occupation, have been suppressed in salary and dignity and suffered the browbeating of the systems programmer.

- An average computer operator can be promoted to be a junior systems programmer, yet a person with a bachelor of science degree in computer science can not get a job as a junior systems programmer without at least two or three years' experience "doing only that."

- Many service bureaus and data centers require an individual to fill roles as diverse as keypunch operator and system analyst, yet they maintain fixed salary ranges and exercise a reluctance to compensate for overtime.

- Those of us cast by fate to temporarily assume non-DP occupations to resume studies, acquire more income, etc., are ostracized when we attempt to get back on the DP bandwagon because of "no recent experience."

To attempt to cite all the inconsistencies of our profession would require the compiling of a tome, which I shall not attempt. My desire is only to bring to light some of the practices with which we in DP are constantly faced and to elicit a solution.

To say that our profession is too new to have dynamic and equitable personnel practices, affording just compensation for just performance, is about as illogical as our persistence in supporting second-generation keypunch cards on fourth-generation systems.

"Sycor 350 terminals perform the edits and checks we used to do on-line. At a fraction of the time and cost."

Jack Robinson, Asst. VP
State Street Bank of Boston

State Street Bank & Trust Company of Boston is one of the largest custodian banks in America with over 125 portfolios totaling some \$20 billion in assets. This includes serving as custodian bank for mutual funds whose assets represent 30% of the entire domestic mutual funds industry, as well as variable annuities, pension funds, and college endowments.

Each day, the custodian service department must report the net asset value of the mutual funds to the National Association of Securities Dealers for publication by the daily news media.

Getting this information out on time — and getting it out accurately — is vital. To do it, the bank depends on Sycor 350 terminals for processing over 500 daily portfolio and general ledger transactions.

Sycor picked for speed and economy.

"Our growth was placing heavy demands on both our on-line ter-

minal network and keypunch facilities," notes Jack Robinson, assistant vice president. "Type-writer terminals were simply not fast enough to get the job done, and making improvements in the on-line program would have required a massive overhaul."

"The replacement of on-line terminals with Sycor 350 terminals took care of both problems. It also eliminated the need for nighttime keypunching which helped us save even more on operating costs."



The dual-flexible-disk Model 350 is microprocessor-controlled and has 16k bytes of memory.

Sycor terminals keep working when the CPU goes down.

"Every Sycor terminal has an independent microprocessor, so we have as many back-up systems as we do terminals," Robinson says. "If the mainframe goes down, we can still continue entering data."

"We currently receive 12,000 transactions per month by TWX, phone and mail. We enter the data on Sycor terminals and, at scheduled intervals, transmit it to our CPU. This gives us an on-line batch system that gets the job done economically and gets it done right. It's the best of both worlds."

Find out more.

Put Sycor to work for you. Find out how by sending in the reply card or calling the Sycor sales representative in your area. We're in the Yellow Pages under "Data Processing Equipment." Or, contact Bill Newell, our national sales manager, at Sycor, Inc., Ann Arbor, MI 48104.

Sycor puts computer power where the work is.

SYCOR

Why Would a DPer Ever Give Up His Vacation Rights?

By Miles Benson

Special to Computerworld

If you've ever worked on a payroll program (and you must have, because statistics show there are more payroll programs in existence than programmers), you know that payroll programs collect all kinds of wondrous data.

Not just the hours worked and pay rate, figured by the week and year-to-date. That's for classroom exercises. Not even just Social Security and all the other deductions thrown in.

A real, healthy, functioning payroll pro-

gram also keeps track of sick leave and credit union balance and vacation and...

I could go on, but I won't. Vacation is what I want to talk about.

There's something I just plain don't understand about vacation time. It's a sociological phenomenon, and I don't know what to make of it. Let me explain.

Last month I had to write a program to prepare a special report. It happens every year, but this year I got the short straw. The report was a summary of unused vacation time. By employee.

No sweat, right? Access the payroll data base, tally the vacation hours used, subtract from the eligible hours for that employee. Software at its simplest.

Well, it's not the program that bothers me. It's the report. I snuck a look before I turned it over to management. And what I saw is what I don't understand.

For instance, there's Brian Dudley, who has 160 hours of unused vacation time. That's 20 days. And there's Sam Stirpes, with 216 hours — 27 days. And worst of all, from the point of view of my confusion, is Clifford Lancer, who has 248 hours. That's 31 days. And there were 53 other computer types in the same boat.

Now, there are a couple of reasons why I don't understand this. For one, the company cuts you off at 120 hours. I mean, if you have any unused vacation time past 120 and you don't use it up the following year, it goes away. So why does anyone get into a position where he'll simply give away his vacation rights?

The second reason I don't understand is that I know these guys. I mean, Brian Dudley is a programmer, a 40-hour-a-week grunt like me, and he doesn't owe the company a thing. Why should he give his vacation away?

And Sam Stirpes? Well, he's a dedicated family man — six kids at home, nice kids, all of them reasons why I'd think he'd want to be home every chance he got. Sure, he loves designing complex test cases in his product test job, but he can't love it that much, can he?

And Clifford Lancer may be a first-line manager, and he does work long hours, but wouldn't his value to the company increase if he'd refuel himself periodically with some vacation?

So there's my confusion. Why would otherwise sane people throw away one of the fringe benefits of their job for no apparent reason?

around is bad and your job's in checkout. Like now. Let me share my fantasy with you.

Suppose the company really does want to milk the most time out of its employees, even to the point of getting them to sacrifice their vacation time. Suppose, in other words, that corporate management has a plot to subtly coerce its employees into donating their vacation time to the cause.

Paranoia, right?

But let's go further. How subtly is subtly? I mean, these guys are smart. If the company were overtly screwing them, they'd know it.

But what if the cause and the effect were well separated? What if, for instance, the company deliberately signed contracts with impossibly tight schedules? And what if it didn't tell anyone it had?

Then responsible, hard-working guys like Brian and Sam and Clifford would work their tails off to make those schedules come out right. And probably if they didn't make it, they'd blame themselves, not the company.

If their own sense of responsibility didn't get them, peer pressure would. I mean, who can refuse to sacrifice when all about you are?

Well, as I said, it's a fantasy. A paranoid fantasy. Probably the real truth is that the company is conducting a secret "Failure to Take Vacation Sweepstakes," and the information was leaked to a few key employees so they could get a head start. Now, there's an explanation you could build a real fantasy on.

I mean, a malevolent company? That's just too paranoid to believe. Isn't it?

The Scarey Part

Well, I'm not one to let confusion grow under my feet. I asked Brian and Sam and Clifford why they did it. And here's the scary part.

They didn't really know, either.

Oh, they mumbled some things about schedules and deadlines and pressures and falling behind. But I don't buy it. There has to be a better reason.

I mean, how many people are so concerned about the company's books that they'll sacrifice themselves to help keep them balanced?

So I've fantasized a reason. Good healthy fantasies are a nice pastime when turn-



'Ed Is Our Expert in Hexadecimal Arithmetic.'



TEXAS INSTRUMENTS
INCORPORATED

Just one of the many leading companies you'll see at

COMPUTER
EXPO 77

Texas Instruments will display its newest product, the Model 810 wide carriage, 150-cps multi-copy printer, several models of its popular line of Silent 700 Electronic Data Terminals including the 13-pound Model 745 Portable Terminal, and the 990 mini/micro computer family.

Organized by:

COMPUTER
CARAVAN
77

The national computer exposition that's coming to you.
797 Washington Street, Newton, MA 02160
(617) 965-5800.

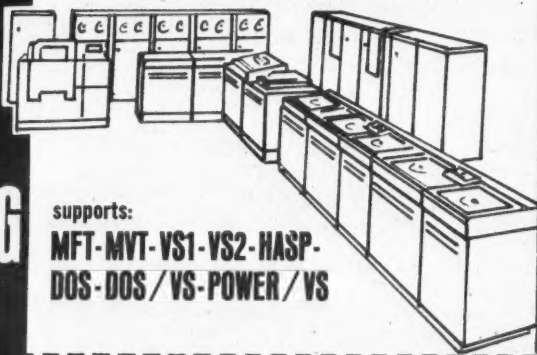
San Francisco • Los Angeles • Cleveland • Minneapolis/St. Paul
Chicago • New York • Philadelphia • Washington, D.C. • Boston. Starts March 29th.

OVER 700
DP
Managers
now use
the
JOHNSON
JOB
ACCOUNTING
REPORT
SYSTEM

Send for
FREE
30 Page System
Characteristics
Manual



■ Accurate Job Accounting ■ Continuous
Performance Measurement ■ Equitable
Cost Distribution ■ Optimized Software
Performance ■ Accurate Customer Bill-
ing ■ Realistic Thruput Analysis ■ Opti-
mum Resource Utilization



supports:

MFT-MVT-VS1-VS2-HASP-
DOS-DOS/VS-POWER/VS

JOHNSON SYSTEMS INC.

8400 Westpark Drive, McLean, Virginia 22101

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

PHONE _____

COMPUTER _____

OPERATING SYSTEM _____

Marketing-Minded OEMs Wanted

We're looking for a few firms who will take our best-on-the-market telephone call accounting equipment—add software, hardware, service and maintenance—then present the package to business phone users.

The market for this system is big and it's growing. Business telephone expenses now rank number three behind payroll and rent.

Any company spending \$5,000 a month or more on their phone bill can expect to save 10% to 40% through effective management control. Our PBX telephone call accounting system develops the accurate, reliable data needed to show them just how to do it—by making the best use of WATS, FX and tie-lines, by plotting traffic patterns, by developing accountability for individual extensions, by cutting phone abuse—and a

number of other ways to fine-tune a phone system and trim waste.

We've served the telephone industry for over 25 years and our reputation is one of the best. We want OEMs who will give the kind of service that Alston has built its reputation on.

We offer you systems expertise, technical and sales training and advertising and promotional support.

The opportunity is here. If you think it might be right for your firm, we'd like to talk with you.

Write or call Doug Swain immediately.

ALSTON®

TELEPHONE DATA SYSTEMS

1724 South Mountain Avenue

Duarte, California 91010

Tel: (213) 357-2121



CONRAC
CORPORATION

Training Budget Gone

Consortium Approach Provides Free In-House Course

By Don Leavitt
Of the CW Staff

WORCESTER, Mass. — When times get tough and DP budgets are slashed, training dollars are often the first to go.

When that happens just as a DP department is considering a move to new programming techniques, the result may be a delay of the move or a disappointing half-hearted training effort.

But delay and disappointment aren't necessarily part of the scene, even if the training budget has been completely zeroed out.

That's what the DP staff of a manufacturing firm here discovered during the most recent recession. Under a plan that can be used in other metropolitan areas, Norton Co. was, in fact, able to get the training it needed for its people free.

At the same time, the plan provided other firms in the area the change to gain the same training at a set fee without the added cost of getting people to and from a distant training center and keeping them there.

It happened this way. In 1975, Norton was on the verge of deciding how and when to implement structured design and programming techniques when economic realities wiped out the training budget.

The budget was gone, but the problem re-

mained: the company had to train a number of system development supervisors to make the right decisions.

Looking for ways to solve the dilemma, Kate Oliver, then Norton's DP training coordinator, talked to Brandon Systems Institute, Inc. (BSI), a Maryland-based organization that presents seminars, both "public" and in-house, across the country. The talks led to action.

About two months later, Dr. Ned Chapin presented BSI's two-day course on the management of structured design and programming to Norton's supervisors at Norton's offices — at no cost to Norton.

To make this happen, Norton spent the two months before the course setting up a training consortium.

Basic Fee for Training

The basic fee for BSI in-house training, which covers up to 25 students, is eight times the standard BSI public course registration fee plus instructor out-of-pocket expenses for travel and subsistence during the training assignment.

Therefore, Norton's goal was to find nine outsiders in the Boston-Worcester area who needed the same training it wanted.

If Norton charged the nine outsiders the

standard BSI public registration fee, Norton could then fill the remaining 16 seats in the course with its own people, at no cost to the company.

BSI was able to help. It maintains mailing lists of DP managers and training directors, so it ran the list for the Boston-Worcester area and gave the names to Norton.

The Human Connection

It also gave Oliver a list of organizations in the area that had recently asked BSI about its structured design and programming courses.

Fortunately, Norton was also an active member of a local group of DP training coordinators which had recently negotiated a multicustomer contract with a national vendor of audio-visual training.

This group was a natural "captive audience" for the consortium approach.

Morton announced the planned presentation to the DP community. In a letter sent out to all the DP installations in the area, Oliver included a brief outline of the course,

a professional resume for Chapin and an overview of the benefits of taking part in the consortium.

The results... Norton got its nine outsiders.

Since the Norton operation in May of 1975, BSI has helped organize over 40 consortium presentations across the country and in Canada and Europe.

The experience of early sponsors has been distilled and is presented in a "how to" guide provided by BSI as a free service to DP managers and training coordinators.

The *BSI Consortium Sponsor's Guide* contains recommended letter formats for announcing the consortium to the DP community, sample course outlines and professional resumes, survey formats to ascertain the training requirement of neighboring DP organizations and a checklist of steps and hints to organize a successful consortium.

The guide also gives specific tips on details that can make or break a consortium effort.

It discusses, for example, how a sponsor can arrange for the invoicing and collection of outsider course fees with its own accounting department and how to lessen the risk and ensure smooth handling of the money.

This can be a critical part of the plan, a BSI spokesman noted, since the sponsoring organization is legally responsible to BSI for payment of the course fee.

The special services and consultation provided by BSI help ensure the success of the BSI consortium for the sponsor, the spokesman asserted. However, the spokesman added, there is no reason the basic approach cannot be used to announce and conduct non-BSI courses as well.

BSI is at 4720 Montgomery Lane, Bethesda, Md. 20014.

Honeywell Upgrades Level 6 Software

BILLERICA, Mass. — Multitasking, communications, sorting, indexed sequential files and enhanced languages are among facilities that will be available to users of the Honeywell Series 60 Level 6 minicomputers by mid-year, according to the vendor.

The updated operating system and other software were introduced when the company announced expansions to the Level 6 mini line recently [CW, Jan. 17].

However, it can be used on any Level 6 CPU with at least 32K memory, a spokeswoman added.

The Multi-Dimensional Tasking operating system (GCOS6/MDT) allows one or more real-time or communications tasks to run concurrently with a single batch job.

The third operating system introduced for the Level 6 family, GCOS6/MDT is said to be upward compatible with the capabilities of the earlier ones.

Language, Communications Support

A pair of control languages are included in the operating system to provide for dynamic system reconfiguration and loading of an application program.

The user's Execution Control Language (ECL) must be used with batch and program development streams when real-time work is being handled concurrently, Honeywell added.

Communications support includes the ability to transmit files between Level 6 and Level 66 systems, to use teletypewriters or Honeywell CRTs and to work with binary synchronous protocol, the spokeswoman noted.

Within the system software, support for Isam files will be added to the sequential and direct file management modes already provided under earlier operating systems.

License to use the GCOS6/MDT executive is available for a one-time fee of \$800.

A license to use the new operating system and the basic program development tools — the assembler, linker and editor — is available for \$1,600.

Sort capabilities for both GCOS6/MDT and the earlier BES/2 environment will be available to users as options, carrying their own price tags. Though the sorts are packaged separately for each environment, they will cost \$200 each.

Language capabilities will include an RPG for Level 6, described as "generally compatible" with RPGs and RPG-1Is for other small systems, the ANS Cobol-74 compiler and Basic interpreter announced in the fall, enhanced Fortran and Assembler.

Fortran extensions are intended to utilize the floating point processor on the newly

announced 6/43 mini, the spokeswoman added.

RPG will be available for a license fee of \$2,200, while Cobol costs \$2,750; Fortran, \$600; and Basic \$50.

Honeywell Information Systems is headquartered at 200 Smith St., Waltham, Mass. 02154.

Package Reformats Cobol Code

WEST TRENTON, N.J. — The Cobol Source Reformatter (CSR) package from Generated Systems, Inc. (GSI) supports features such as level number indentation, PICTURE and clause alignment, keyword recognition and nested IF/ELSE logic indentation, according to the vendor.

Centering and boxing of comments, highlighting of division and section headers, paragraph spacing and line sequencing and identification are other options, GSI added.

The degree to which any of these options is used in a particular reformatting run is determined by user-selected parameters.

These may cover such things as number of lines left blank between paragraphs or the number of columns indented for a continuation line or an ELSE related to a previous IF.

The formatter, written in ANS Cobol, can

be used as a stand-alone utility, in which it might serve to highlight an inadvertent gap in a programmer's logic, or as a preprocessing step in the basic compilation process, a spokesman explained.

CSR is available as a package, requiring about 150K bytes of memory, and is implementable on almost any mainframe that supports ANS Cobol.

It costs \$500, with maintenance after the first month available for \$100/yr.

The capabilities of the formatter are also available on a service basis through GSI.

This might be useful to an installation interested in testing the package before acquiring it for in-house use or as a means of getting the reformatting done without tying up the user's own system, GSI suggested.

GSI is at 140 Scotch Road, West Trenton, N.J. 08628.

**JASPER
JOB
ACCOUNTING
SYSTEM**

- JOB ACCOUNTING
- VS PAGING ACTIVITY
- FORMS USAGE REPORT
- POWER/VS ACCOUNTING
- A COMPUTER CHARGEBACK SYSTEM
- COMPUTER PERFORMANCE ANALYSIS

CALL OR WRITE DATACHRON • 174 FIFTH AVE. • NEW YORK N.Y. 10010 • 212 • 675-5333

☐ HAVE YOUR REPRESENTATIVE CALL

name

company

address

city

☐ SEND INFORMATION

title

tel.

state

zip

JASPER is a Job Accounting and billing system for DOS or DOS/VS computers.

The VS version captures paging statistics and utilizes the POWER/VS Spooler accounting records to measure reader, printer and punch activity and provide turnaround and queue time statistics.

User billing is handled by a sophisticated report generator program that lets you "do it your way".

An optional performance analyzer program gives JASPER a "hardware monitor" capability that no other job accounting system can match. CPU, Paging and Device Activity are plotted by a graph generator in a series of "Activity vs Time" graphs that measure overall computer performance and spotlight over, and under utilized equipment.

JASPER installs quickly and is easy to use. Run-time of the Daily programs on a 370/135 is 5-10 minutes.



Just one of the many leading companies you'll see at

COMPUTER
EXPO 77

DELTA DATA SYSTEMS Corporation will exhibit video display terminals and systems for data handling and data communications. Included among these products are the DELTA 4050 microprogrammed video display terminal with emulation for Burroughs, Honeywell, and Univac and other computers and display terminals; the DELTA 4700 "intelligent" workstation consisting of keyboard, display, microprocessor, and floppy disk storage devices; and the DELTA 4000 microprogrammed video display terminal with light pen for convenient, rapid data entry.

Organized by:

**COMPUTER
CARAVAN
77**

The national computer exposition that's coming to you.
797 Washington Street, Newton, MA 02160
(617) 965-5800.

San Francisco • Los Angeles • Cleveland • Minneapolis/St. Paul
Chicago • New York • Philadelphia • Washington, D.C. • Boston. Starts March 29th.

Useful by Itself

Data Dictionary Built for IDMS

WELLESLEY, Mass. — The Integrated Data Dictionary (IDD) developed by Cullinane Corp. as a logical extension of the company's Integrated Data Base Management System (IDMS) should be ready for general release by mid-February, according to a spokesman.

Despite its basic design goal of enhancing IDMS operations, IDD can be used by installations with other data base management systems already installed or being considered, Cullinane said.

In common with other dictionary packages, IDD creates a central repository of information about the using installation's data assets, regardless of file type, storage mode or processing method.

A Data Dictionary Definition Language (DDDL), "English-like, free-form and programming language independent," is a key

component of IDD, Cullinane noted.

There is also an "active" interface with IDMS' Cobol and PL/I processors, the spokesman added.

Range of Facilities Provided

The degree of integration of IDD and IDMS provides users with a range of facilities, including documentation through the data dictionary file and data privacy through subschema restrictions, he said.

IDD users also have automatic recovery and data integrity through IDMS utilities, and use of the dictionary without waiting for batch operations through Cullinane's On-Line Query system, the vendor added.

The word "active" is very appropriate in describing IDD's linkage to Cobol and PL/I programming efforts, the spokesman said, explaining that as programs are compiled, IDD "automatically" captures the new logic's effect on all data elements.

This is true whether a program is using a data base or standard files in its processing, he noted.

IDMS users can acquire IDD for \$12,500; others can have it for \$15,000, the company said from Wellesley Office Park, 20 William St., Wellesley, Mass. 02181.

RSTS/E Users Offered 'Fsort'

LEXINGTON, Mass. — A sort now available from Evans, Griffiths & Hart, Inc. (EGH) is said to handle key files faster under Digital Equipment Corp.'s RSTS/E time-sharing system than PDP-11 users can get under DEC's own sort capabilities.

The machine language-coded package, called Fsort, is primarily intended to serve as a compatible replacement for the Basic-Plus coded Sqwik and Mqwik modules from DEC's RSTS-11 sort system.

While compatible, the in-core sort can, under certain circumstances, handle more keys than the DEC software, EGH claimed.

Measurable Improvement

Fsort's developers claimed to have measured stand-alone wall-clock time improvements of between eight and 30 times over the comparable components of the DEC sort. They also claimed CPU time reductions of "about 96%."

The variability in wall-clock time improvements is attributed to a number of factors, including the sort job core size, the ratio of CPU speed to disk access speed and even the nature of the particular key files involved, according to a spokesman.

Although the key file and calling conventions within Fsort are compatible with the RSTS sort, the utility can be used independently of that software with "suitably programmed user interfaces," he said.

Used in such an independent mode, Fsort can be used to sort up to 65K keys, or twice as many as is possible with DEC software, the spokesman added.

The heart of Fsort is a 2K run time system which is installed under RSTS/E, version 6A and later versions and used with in-core sort areas as small as 5K words or as large as 28K, depending on the system and conditions under which it is run.

The license fee of \$2,500 includes the first year warranty and updates, EGH said from 1844 Massachusetts Ave., Lexington, Mass. 02173.

Correction

The Fasnet distributed data network service now available from University Computing Co. (UCC) [CW, Jan. 10], allows local access to UCC's multiple Fasbac systems from more than 60, not six, cities in the U.S. and Canada, a spokeswoman noted from the vendor's headquarters in Dallas.

Only terminals from NTC come with a free insurance policy.

Here's how to guarantee your investment in data terminals: buy from NTC. We have the largest selection of new and reconditioned units. The lowest prices on the highest quality name-brand terminals. And now we're giving you an Investment Protection Plan that completely eliminates the chance factor from your purchase. It's the only one of its kind. Anywhere. Here's how it works.

Select from a wide variety of printers and CRT's. Top names like TI, DEC, Diablo, Lear Siegler, Hazeltine. We'll work with you to make sure you choose the right terminal for your data processing system. If it isn't, we'll give you your money back under the terms of your NTC Investment Protection Plan.

You get a full manufacturer's

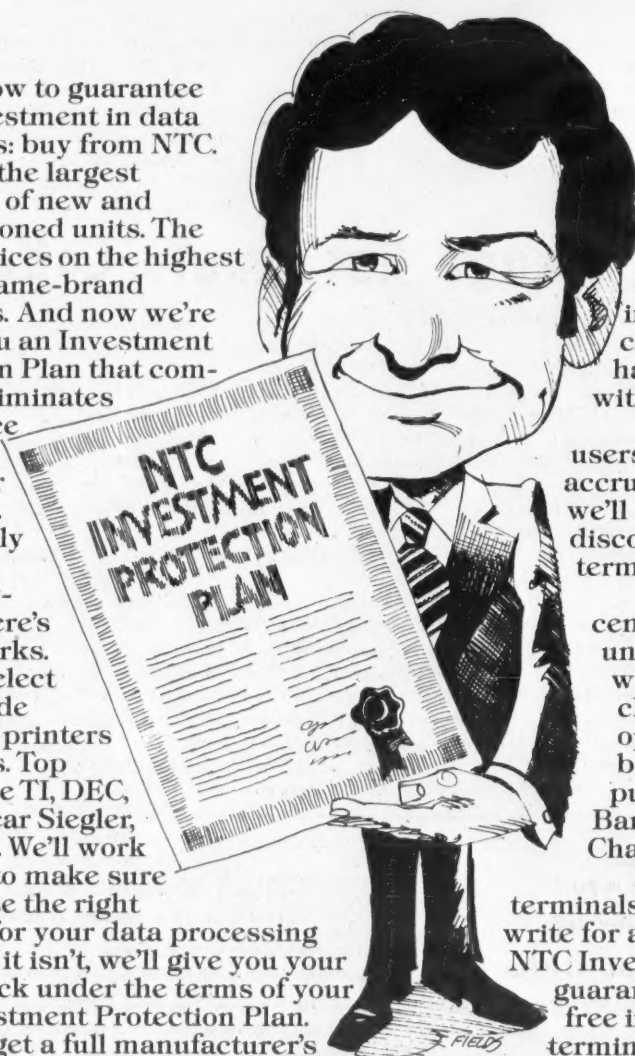
warranty on all new equipment. And extensive warranty and optional full manufacturer's maintenance on reconditioned terminals.

When it comes to dependable, fast delivery, we're second to none. Call your order in and we'll make a delivery commitment on the spot. You'll have your terminals usually from within three days to three weeks.

For both large and small users, quantity discounts can be accrued over a 12-month period. And we'll give you combined quantity discounts on mixed-brand terminal orders.

Buy at NTC and obsolescence is a thing of the past. We have unique trade-in/trade-up plans which can exactly meet future changes in your data processing operations. And you can choose between purchase, lease, lease/purchase or rental plans, with BankAmericard and Master Charge accepted.

For the best deals in data terminals call NTC immediately. Or write for a brochure and a copy of the NTC Investment Protection Plan which guarantees your satisfaction. It's your free insurance policy with every terminal you buy from NTC.



NTC National Terminal Corporation

Oakland Airport Office Center, 303 Hegenberger Road, Suite 203
P.O. Box 6579, Oakland, CA 94621, (415) 632-2856

Call toll free (800) 227-1102*

*In California Call (415) 632-2856



Quantity, Quality Improvements Highlight Latest DP Bibliography

More than 225 new books are listed in the 10th edition of the *Annual Bibliography of Computer-Oriented Books*, published this month by the University of Colorado.

Notable in this year's listing is the increase in quantity and quality of books on the subjects of system design and program design. In addition, the number of books on data communications increased by 50%.

All books prior to 1971 were deleted, except for a few classics like James Emery's *Cost/Benefit Analysis of Information Systems*. Despite the deletions, the bibliography still contains more than 1,000 books from 210 publishers.

The bibliography separates books into 55 categories and catalogs them according to type (reference, textbook, handbook) and style of presentation (programmed instruction, case study or narrative discussion).

A new category on program design was added this year because of the increase of books on this subject. Ten new books were published in this category, including *Software Tools* by Kernighan and Plauger, *Software Reliability Principles and Practices* by Glen Meyers is another example of the improvement of books in this category.

Data Base Books

The most significant improvement in quality of books is in the system design category. John Lyon's *Database Administrator* is an example. There are now 29 books on data base.

The data communications section contains eight new entries, including James Martin's latest, *Telecommunications and the Computer*.

Another valuable addition to the system design section is *Integrity and Recovery in Computer Systems* by T.K. Gibbons.

Ten books were added in the system analysis category. The section on computer applications was expanded by 28 entries. An important addition in that category is *Computer Audit and Control*, a 489-page tome by Mair, Davis and Woods.

Advanced Programming Area

Continuing the trend of the past two years, the additions to the advanced programming area evidenced considerable improvement. Twelve new books were published, including David Hsiao's *System Programming: Concepts of Operating and Data Base Systems*. Another classic was published: Edsger Dijkstra's *A Discipline of Programming*.

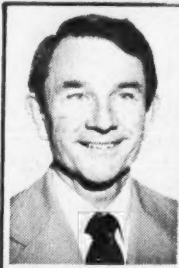
Release of 'Splice' Aligns IF/ELSE Code

SACRAMENTO, Calif. — Responding to an increased interest in structured programming, Software Module Marketing (SMM) has modified Splice, its Cobol pre-processor, to include IF/ELSE alignment as part of its basic function.

With the enhancement, Splice will realign Cobol programs so the ELSE appears under the relevant IF according to compiler rather than programmer interpretation.

In addition, nested IFs are successively indented by four columns, and all detail lines are indented four columns from the appropriate IF or ELSE, the vendor said.

A permanent license is available for \$5,000; monthly rental and lease/"purchase" terms are also available, the firm said from Crocker Bank Building/Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.



J. Daniel Couger
On
Education

Until 1974, few good books were available for the specialized area of DP management. That section was enhanced in 1976 by such publications as *Guide to Successful Computer System Selection* by Kearney and Mitutinovich. There are now three books on performance measurement.

The computer reference section lists the handbooks that should be a part of the computer library of every organization.

The flood of programming textbooks has diminished to a trickle in several categories. Only two RPG and two PL/I books were published last year. However, nine new books on Cobol and four on APL were released.

A noticeable difference occurred in the design of many of the new programming books — they are oriented toward structured programming. It is now possible to

VS Concepts Taught In-House

McLEAN, Va. — Application programmers and systems analysts in IBM-based installations can gain the education they need to take advantage of VS with a modular course called "Program Design for VS," according to the developer-vendor, JRB Associates, Inc.

The course, designed for in-house use, explains the concepts and mechanisms of VS programming and — "more importantly," a spokesman added — presents and describes effective design and coding strategies and guidelines.

The course "package" includes an initial two-day class taught at the user site by a JRB instructor; course materials; and duplication rights to the materials.

The course materials are modularized into 16 topics to simplify course tailoring and preparation work by the in-house instructor.

The instructor's guide for each module states the module's objective and suggested timing. It also contains an outline of the material, explanations of the visuals and a detailed list of references and resources, the vendor added.

The package is available for \$3,900 plus the cost of travel and accommodation of the JRB instructor. Scheduling is subject to negotiation, the firm noted from 8400 Westpark Drive, McLean, Va. 22101.

find a structured programming book in every major programming language: PL/I, Cobol, Fortran, Algol and APL. Previously, structured programming was confined to books on PL/I.

Copies of the bibliography are available

for \$4 from *Computing Newsletter*, Box 7345, Colorado Springs, Colo. 80933. The cost is \$5 if an invoice is required.

Couger is professor of computer and management science at the University of Colorado.

Introductory offer to new members of the COMPUTER PROFESSIONALS' BOOK CLUB

any one
of these great
professional books
for only **\$1.89**
values up
to \$29.95

**Special \$1.89 bonus book comes to you
with your first club selection**

<p>768/528 DATA PROCESSING SYSTEMS ANALYSIS AND DESIGN by R. J. Condon Pub. price, \$13.50 Club price, \$10.75</p> <p>768/79X PRIMER ON STRUCTURED PROGRAMMING: USING PL/I, PL/C, AND PL/CI by Richard Conway and David Gries Pub. price, \$8.95 Club price, \$7.50</p> <p>767/343 DATA MANAGEMENT FOR ON-LINE SYSTEMS by D. Lefkowitz Pub. price, \$14.95 Club price, \$11.95</p> <p>767/203 DATA PROCESSING MANAGEMENT by D. H. Brandon, A. D. Peilley, & A. M. O'Reilly Pub. price, \$29.95 Club price, \$21.50</p> <p>767/513 PROGRAMMING LANGUAGE by J. E. Sammet Pub. price, \$21.00 Club price, \$17.50</p> <p>768/498 DIGITAL SYSTEM DESIGN AUTOMATION: Languages, Simulation, and Data Base by Melvin A. Breuer Pub. price, \$18.95 Club price, \$15.95</p>	<p>770/271 BUCHSBAUM'S COMPLETE HANDBOOK OF PRACTICAL ELECTRONIC REFERENCE DATA by W. H. Buchsbaum Pub. price, \$17.95 Club price, \$13.50</p>	<p>767/238 COMPUTER PROGRAMMER JOB ANALYSIS An AFIPS Reference Text by R. M. Berger Pub. price, \$10.00 Club price, \$8.50</p> <p>767/53X PROGRAM STYLE, DESIGN, EFFICIENCY, DEBUGGING, AND TESTING by D. Van Tassel Pub. price, \$12.00 Club price, \$9.95</p> <p>766/479 THE U.S. COMPUTER INDUSTRY: A Study of Market Power by G. W. Brock Pub. price, \$15.00 Club price, \$12.50</p> <p>768/17X BENCHMARKING: Computer Evaluation and Measurement by N. Benwell Pub. price, \$19.95 Club price, \$14.95</p> <p>394/555 OPERATING SYSTEMS by S. E. Madnick & J. J. Donovan Pub. price, \$19.50 Club price, \$14.25</p> <p>767/092 DATA PROCESSING DOCUMENTATION: Standards, Procedures, and Applications by W. L. Harper Pub. price, \$22.95 Club price, \$17.50</p>
--	---	--

save time and money
by joining McGraw-Hill's new
**COMPUTER PROFESSIONALS'
BOOK CLUB**

THIS new professional club is designed to meet your day-to-day on-the-job needs by providing practical books in your field on a regular basis at below publisher prices. If you're missing out on important technical literature—if today's high cost of reading curbs the growth of your library—here's the solution to your problem.

The Computer Professionals' Book Club was organized for you, to provide an economical reading program that cannot fail to be of value. Administered by the McGraw-Hill Book Company, all books are chosen by qualified editors and consultants. Their understanding of the standards and values of the literature in your field guarantees the appropriateness of the selections.

How the Club operates: Every month you receive free of charge *The Computer Professionals' Book Club Bulletin*. This announces and describes the Club's featured book of the month as well as alternate selections available at special members' prices. If you want to examine the Club's feature of the month, you do nothing. If you prefer one of the alternate selections—or if you want no book at all—you notify the Club by returning the card enclosed with each Bulletin.

As a Club Member, you agree only to the purchase of four books (including your first selection) over a two-year period. Considering the many books published annually, there will surely be at least four you would want to own anyway. By joining the club, you save both money and the trouble of searching for the best books.

MAIL THIS COUPON TODAY

COMPUTER PROFESSIONALS' Book Club
P.O. Box 582 Princeton Road, Hightstown, New Jersey 08520

Please enroll me as a member and send me the two books indicated. I am to receive the bonus book at the introductory price of \$1.89 plus my first selection, plus tax, postage and handling. If not completely satisfied, I may return the books within 10 days and request that my membership be cancelled. If I keep the books, I agree to take a minimum of three additional books during the next two years at special Club prices (guaranteed 15% discount, often more). I will receive the Club Bulletin 12 times a year. If I want to examine the featured selection, I need take no action. It will be shipped automatically. If, however, I want an alternate selection—or no book at all—I simply notify the Club by returning the convenient card always enclosed. I will always have a minimum of ten days in which to return the card and you will credit my account fully, including postage, if this is not the case. Membership in the Club is continuous but cancellable by me at any time after the four-book purchase requirement has been filled. This order subject to acceptance by McGraw-Hill. Orders from outside the continental U.S. must be prepaid. All prices subject to change without notice. Offer good for new members only.

Write Code # of \$1.89 bonus book selection here _____

Write Code # of first selection here _____

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

EXTRA SAVINGS: Remit in full with your order, plus any local and state tax, and McGraw-Hill will pay all postage and handling charges. **P39187**

A Programmer's Education

'Homemade' Monitor Puts 360/40 Data Entry On-Line

By Norman E. Bollinger

Special to Computerworld

"Nobody around here needs an on-line system. Besides it would cost too much anyway." Classic complaints, but what were the facts for us at the Board of Education for Baltimore County in late 1975?

Concepts and Techniques

Could we put our new personnel system on-line to a batch-oriented IBM 360/40 running under DOS?

With an 80K partition available and the dirt-cheap cost of local IBM 3270 CRTs — rental came to \$1.35/hour based on a seven-hour day — the only thing that stood in our way was software. So we took a look at what was available.

Two local installations had developed their own on-line monitors and we looked at them and at packages that were on the market.

None of them really fit together with our data base package and some of them would require more than 80K. So, back to the software problem.

We had Cincom Systems, Inc.'s Total data base management system, which was ideal for on-line updating — but we didn't have the time-sharing and terminal software to make it work in 80K.

At worst, we could start with

one of the homebuilts and enhance it to meet our needs.

As it turned out, the homebuilt monitor had no comments in the assembly coding and it was a bear to put data on the screen.

Could we do any better?

Over the years I had accumulated a good knowledge of DOS assembly techniques, but missing were two large undeveloped components for the on-line design. The first was recovery of data bases and CRTs and the second was the CRT I/O.

I proceeded to develop a time-sharing system with secret user codes and a menu of user programs. Within one month, this was coded and tested on the IBM 1052 console. That was very encouraging.

Biggest Problem

The biggest problem was the CRT I/O. A CRT operator could modify any, none or all of the modifiable fields on the screen. But how does the host program know which ones were modified?

Since the CRT knew that information, it was easy to pass back a list of the relative fields that were modified. Then a Cobol program could use a GO TO ... DEPENDING ON statement to process the changes.

That was beautiful for programmers. Also, there is no need to store screen formats. The application program in the 360/40 owns

the screen format and easily uses the 3270 field features.

With CRT I/O out of the way, the next tough problem was data base recovery. It was easy to checkpoint the system and restart with the last screen image, but what about recovery?

Most systems do some kind of transaction logging which is programmer dependent, but the 3270 was not transaction-oriented. That would be extra work for the programmer to format the screen into a transaction.

Then I found another Total user was logging the contents of a successful update call.

That was it — a new generation of on-line recovery technology. We wouldn't need a complex transaction reprocessor — just a simple program to repeat the data base updates in a matter of a few minutes. That was beautiful and programmer independent.

After a year of operation, our decision to build our own on-line software is still a good one. It was an economical decision; the development time was only four man-months which meant it was cost-competitive to those packages available.

The system came up on time and was very easy for the program-

mers to learn. We have never had to recover a data base for any reason.

The neatest touch of all is "new user CRT training," which is done on the CRT itself, based on a computer-assisted instruction course that teaches all of the 3270 features and keys in 25 minutes.

We're handling as many as 20,000 CRT operations in a six-hour day.

Now, everybody around here wants their systems on-line.

Bollinger is a programmer analyst with the Board of Education of Baltimore County, Md.

Scobol Builds on Jackson's Principles

By Martha J. Cichelli

Special to Computerworld

James L. Tucker's article, "Locally Chaotic Modular Code Showed No Structure" [CW, Jan. 10], was a clear and well-written description of what is the obvious algorithm for processing a sequential file.

He mentioned Michael Jackson's excellent book, *Principles of Program Design* (Academic Press, 1975). This book is must reading for all professional programmers who use Cobol. Jackson used a pseudocode notation to extend and clarify Cobol for presenting business DP algorithms.

In 1973, Lars Mossberg of Volvo Flygmotor AB in Sweden attended one of Jackson's European seminars. He quickly became convinced that the pseudocode was so suited for writing programs in Cobol that the process of translation from pseudocode to standard Cobol should be automated.

Mossberg's precompiler, Scobol, spread from Volvo and is now being used in forward-looking programming shops in Europe and the U.S.

Scobol implements Jackson's

fully nestable IF-THEN-ELSE-ENDIF, WHILE-DO-ENDDO, REPEAT-UNTIL, ITERATE-UNTIL, SELECT CASE-ENDCASE, POSIT-ADMIT-ENDPOSIT and the QUIT BLOCK statement.

The sequential file processing routine in Scobol would read:

```
PERFORM READ-TRANSACTION
WHILE (MORE-TRANSACTIONS) DO
  IF (TRANSACTION-CODE-IS-VALID)
```

```
THEN
  PERFORM PRINT-TRANSACTION
ELSE
  PERFORM PRINT-ERROR
ENDIF
PERFORM READ-TRANSACTION
ENDDO
```

The Scobol code can make even well-structured Cobol code (which Tucker's certainly is) look awkward by comparison.

Cichelli is with Software Consulting Services in Allentown, Pa.

Seminars Cover Long-Term Plans

ROCKVILLE, Md.— Keston Associates will present a series of four-day workshops on "How to Develop an Effective Long-Range Data Processing Plan" in the Washington, D.C., area March 14-17 and May 16-19 and in San Francisco April 4-7 and June 6-9.

Workshop Objective

The objective of the workshop will be to establish a viable planning mechanism as a means of controlling the DP function, Keston explained. A workable set of planning methods and procedures will be presented.

Specific material covered will include a technique for the projection of future user requirements, a

mechanism for mediating between competing user priorities and a procedure for estimating impending hardware, software and personnel needs, Keston added.

The registration fee is \$495; further information is available from Keston Associates, 11317 Old Club Road, Rockville, Md. 20852.

Rapidata Lowers Rates

FAIRFIELD, N.J.— Rapidata, Inc. has announced revisions in processing charges for large-scale jobs using the company's Background-10 system.

The revised rates provide an incentive for customers to run applications requiring more than 30K of core during nonprime time by offering discounts of up to 83% on weekends and 72% on weekday evenings, a spokesman claimed.

Nonprime-time hours are between 5:30 p.m. and 8 a.m. the following day.

'Spare-Time' Basis

Background-10 processing allows jobs to be run on a low-priority, "spare-time" basis without the user remaining on-line. Users can specify the date and time jobs should run.

Background-10 is a "natural" for batch processing applications when used with archive storage and Rapidlink. Rapidata's software interface for communications between its system and a user's in-house computer, the spokesman added from 20 New Dutch Lane, Fairfield, N.J. 07006.

DATAPoint USERS

CONSULTING SERVICES

- Datashare
- Databus
- Communications

Transport Control International, Inc.
88 Pine Street
New York, N.Y. 10005
(212) 952-0150

Systems Checklists

350 pages of the most current and complete guidance for Systems Analysts. Checklists and techniques for every phase of systems constructions. \$20 postpaid; \$25 invoiced against P.O. Add \$3 First Class Postage.

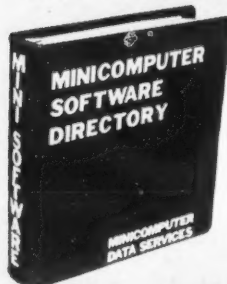
THE NEW DIVISION
Box 913
North Chelmsford, MA 01863

Kybe Magnetic Tape Certifier

Model CS - 1600

Factory maintained. Excellent condition. 7/9 track. Spare parts and microscope. 10K firm. Scott Crozier (206) 593-7036.

FIND MINI-SOFTWARE SERVICES FAST



MINICOMPUTER SOFTWARE DIRECTORY

Instant access to descriptions of hundreds of minicomputer software packages and services.

DIRECTORY INDEXED 4 WAYS

- Indexed by applications and services
- Profiles of supplier companies
- Geographic locator
- CPU's supported by suppliers

Annual Subscription \$70

INITIAL ISSUE plus 2 updates. Send check or PO

MINICOMPUTER DATA SERVICES

20 COVENTRY LANE, RIVERSIDE, CT. 06878

REMOTE BATCH PROCESSING

ON IBM'S FASTEST CPU

360/195

TIME FOR SALE

GUARANTEED
TURNAROUND
only
50¢ a second

OS/MVT, HASP/RJE, 2 Meg, 3330's and 2314's — United Airlines operates a Cost Efficient service featuring High Speed Processing and Quick Turnaround. Through Auto Answer WATS or leased lines (at speeds of 2000 to 9600 BAUD) you gain access to one of the most complete data centers in the United States.

Dial our number and execute your own programs or utilize a wide range of software — ICES, MARKIV, OSIRIS, BMD, PANVALET, GPSS, HEC1, HEC2, SWMM, all standard compilers and more.

If you are using an outside computer service, United can offer you a substantial savings and an unbeatable service.

COMPARE — call or write today to request a benchmark or additional information.



UNITED AIRLINES

Computer and Communications Services Division
Denver Technological Center
5350 South Valentia Way
Englewood, Colorado 80110

Call Collect (303) 779-2000 — Ask for Jon Burley

Data Briefs

UL Publishes Standard For ATM Manufacturers

CHICAGO — Underwriters Laboratories, Inc. (UL) has released the first edition of its standard for automated teller machines (ATM), UL 291.

The UL requirements apply to the construction and security of equipment intended to automatically dispense currency when properly operated by an authorized customer and were designed to provide protection against unauthorized removal of currency.

In the publication, UL also set forth standards for the protection of deposits made by customers and protection against unauthorized manipulation or removal of the records that would prevent the proper debiting for the currency dispensed.

The requirements cover electrical, mechanical and structural design of the terminals and accessory equipment.

As of September, four vendors of automated tellers had machines which were UL-approved: Burroughs, Diebold, IBM and NCR, according to a UL spokesman.

The 43-page publication, "Standard for Automated Teller Systems," intended for manufacturers, costs \$3.50 per copy or \$9 for the booklet and a subscription service to any revisions issued, he said.

Requests for copies should be sent to the attention of the Publication Stock Department, UL, 333 Pfingsten Road, Northbrook, Ill. 60062.

Tandberg Cartridge Recorder Gets Controller Interface

SAN DIEGO — Tandberg Data, Inc. has added a microprocessor-based RS-232 communications controller interface for its TDC 3000 digital cartridge recorder.

The controller is contained on one printed circuit board which mounts inside the recorder. It can be programmed for special requirements such as communications protocol generation and format checking and features selectable parity options and transmission rates, according to Tandberg.

The controller operates in half- or full-duplex modes; routines for detecting and correcting data errors reportedly are standard.

Two interface connectors are provided which allow the TDC 3000 to be connected to a local I/O terminal or a modem, a company spokesman said, adding the controller will respond to control characters from the local terminal or modem.

These characters control up to four tape drives and provide the user with editing capabilities, he noted.

The I/O controller interface costs \$2,850 from Tandberg at Suite 407, 4901 Morena Blvd., San Diego, Calif. 92117.

By Toni Wiseman
Of the CW Staff

NEW YORK — Rising rates, competitive pressures and consumer demands will continue to dominate the telecommunications scene in the year to come, attendees of the National Retail Merchants Association's annual convention were told here recently.

Dr. Lee Selwyn, president of Economics and Technology, Inc., took a look at the major developments in the field as they affect retailers.

The most significant development in the Bell Bill — or Consumer Communications Reform Act — area came last spring with the judgment in the Telerecord case, which said Bell would have to allow interconnection to its facilities, Selwyn said.

Until the Bell Bill comes up for reconsideration in Congress, users cannot afford to relax, he said, urging careful scrutiny of certain rate policies which have been cropping up within Bell.

Traditionally, energy rates have been provided under step-down rate structures, and

there have been policies within the energy area which relate to conservation. These include policies flattening the rate structure — with certain exceptions of time-of-day rates — for business, Selwyn said.

Elimination Idea

In communications, however, the industry is not dealing with a scarce or limited resource, he pointed out, but the idea of eliminating bulk rates has caught on.

In the private-line area, for instance, the Federal Communications Commission (FCC) ruled incremental costing could not be applied in the telecommunications field; instead, fully distributed costing must be applied. The immediate effect of this decision was to eliminate the remnants of the Telpak-type rate plan for private services, he stated.

The same type of policy has been applied in other areas, such as Centrex, he said; where the pricing had been incremental, Bell is now using an average-cost approach.

This means the costs for large systems are

now greater than for small systems since they no longer benefit from volume discounts, he explained.

New Wats Tariff

Three years ago, Bell filed a tariff eliminating the unlimited Wats plan and replacing it with a full business day service plan, Selwyn said.

Last spring, he noted, the FCC rejected Bell's plan on the grounds of insufficient cost information. Bell was given five months — until last November — to file a new proposal, but it still has not done so, requesting an extension, he said.

While exact, detailed information on the forthcoming tariff is not available, information on the general nature of the tariff has leaked out, he said.

According to these leaks, today's five Wats bands will be reduced to three, designated A, B and C.

In addition, it seems the rate structure will be similar to New York State's intrastate plan with a multistep structure, he said.

Out-Wats will be metered on a time basis in a fairly conventional manner, while In-Wats will be on the same type of multistep structure but with less of a price spread, he said.

The "real rub" is the so-called delivery charge, Selwyn said. In addition to time metering, customers would be charged between 5 cents and 8 cents for every inward call which they get or which receives a busy signal. The object, he said, is to force the customer to install more lines.

While this information is very preliminary and unofficial — the tariff is not due to be filed until April 1 — users should be aware of policies eliminating bulk-type plans and flattening rates, he cautioned.

"In general, if you are making a commitment to bulk service now, you will be faced with larger than usual increases in the future," Selwyn said.

Westinghouse Canada Controller Uses Multiprocessor, Multibus

HAMILTON, Ont. — Westinghouse Canada Ltd. has introduced what it called a highly flexible communications controller employing a multiprocessor and multibus configuration.

The W1655 controller acts as an on-line real-time message switcher and line concentrator to transfer data between a central site CPU and various remote terminal sites, according to the firm.

Data transfer to the central site occurs over two trunk lines operating at 2,400- or 4,800 bit/sec and is handled by the trunk line microprocessor, a Westinghouse spokesman said.

Communications to the terminal sites is accomplished over up to eight primary and eight backup lines at 2,400 bit/sec. Each four primary lines are handled by one remote line microprocessor, he said.

Trunk line traffic is basically under the control of the CPU, which permits a certain flow of data from the controller by updating a permission count detailing the number of message segments which can be sent, he explained.

Shared System Access

Traffic on the remote lines is controlled at the central site for terminal input to the system by a polling scheme scheduling terminal transmission initiation to share system access, the company added.

Each remote line is capable of servicing up

to 16 sites; the total number of terminals the W1655 can handle is 1,064, according to the spokesman.

Data responses from the remote terminals are buffered and placed in a queue for transmission to the central site. A site is not polled, the company said, unless an empty buffer exists to store a possible response.

A "typical" price for a controller handling up to four trunk lines is \$15,000, the spokesman said. Westinghouse of Canada can be reached through P.O. Box 510, Hamilton, Ont. L8N 3K2, Canada.

T-Bar Switcher Allows Testing

WILTON, Conn. — The Multiple-Access Switching System (Mass) from T-Bar, Inc. was designed to allow testing and monitoring of large on-line communications installations.

The switching system brings up to 512 analog or digital lines to a control panel equipped with a thumbwheel switch and push-buttons allowing single-line interrogation by separate testing and monitoring equipment, according to a T-Bar spokesman.

In operation, a line is selected by the three-digit thumbwheel and bridged to a bus for passive monitoring. Pressing a "Test" button causes an additional bus to be bridged onto the line, creating a break between the two buses, he said.

Interactive tests of local and remote terminals and modems as well as the communications line can then be conducted, he explained.

Controls and instrumentation can be located several hundred feet from the lines being tested, the spokesman added.

Mass has a standard RS-232 interface and the company will "probably offer" a CCITT V-35 interface option when the need arises, according to the spokesman.

Mass hardware for analog or digital lines costs \$2,000 plus about \$50/line or \$100/line respectively, depending on the number of lines desired.

An eight-line digital system would cost \$2,500, the spokesman said from T-Bar at 141 Danbury Road, Wilton, Conn. 06897.

Talk to us about Data Communications



That's right, Anderson Jacobson. We started with the industry's first accepted acoustic coupler and we've been expanding ever since. If you want the very best data communications equipment—couplers, modems, modem systems, cassette recorders, and an unmatched selection of keyboard printer terminals... then talk to us.

A phone call or letter to our marketing department will get you "on-line" with the best peripheral equipment for your computer system.



**ANDERSON
JACOBSON**

521 Charcot Avenue • San Jose, CA 95131 • (408) 263-8520
Paris, France • London, England • Ottawa, Ontario

Announcing the Honeywell 6/43.

Honeywell's Level 6 family of mini computers now has more speed, more functionality, more memory, more software and more peripherals.

New Hardware. Model 6/43, newest member of the Level 6 family, offers double-word-access MOS memory (for processor speed up to 60% faster than the Model 6/36) direct addressability of up to one-million words (2-million bytes), a fast Scientific Instruction Processor, efficient memory management and protection, and more.

New Software. GCOS 6/MDT is a disk-based, Multi-Dimensional Tasking, operating system including indexed file management and enhanced communications support. Also new are an RPG compiler and extensions to COBOL, FORTRAN, and Assembler.

New Peripherals. Magnetic tapes, 120 cps console printer, and a more versatile Teletype-compatible CRT.

Honeywell's Level 6. It's quicker and smarter — more computer for your money than ever.

Our quick brown fox just jumped over the competition.



Honeywell

Honeywell Information Systems
200 Smith Street (MS 487), Waltham, Mass. 02154

I am an ☐ End user ☐ OEM

Please send me more information on your Level 6 family of mini computers — especially the new 6/43.

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

COMPUTERWORLD



...the one weekly newspaper that's designed to fulfill your unique "need to know"... the one newspaper that can give you all the current information you need to benefit you, your organization and your career progress... 52 weeks of incisive news, commentary and special reports...subscribe today, use the attached postage paid order form.

☐ Please enter my subscription
(details on back)

☐ I'm already a subscriber,
but I'd like you to
change my:

- ☐ address
- ☐ title
- ☐ industry
- ☐ other

My current mailing label is attached
and I've filled in new information
on the other side.

Put old label or label information here

Detach here, fold, and place in post-paid envelope attached through binding.

Modular in Design

ITS Unveils Micro-Based Product Line

SANTA CLARA, Calif. — International Teleprocessing Systems, Inc. (ITS) has introduced its Series 1000 line of microcomputer-based intelligent terminals and stand-alone communications systems.

A modular design concept is utilized in the programmable Series 1000 products, which include the Model 1100 printer terminal, the Model 1200 communications system and the Model 1600 small business communications system, ITS said.

An Intel Corp. 8080A microcomputer serves as the central control module. Field upgrading as well as hardware expansion through parallel or RS-232 serial interfaces is easily accomplished, a spokesman claimed.

IBM-Compatible Codes

Hardware features of all three products include both Ascii and IBM 2740- and 2741-compatible communications, 1K byte of line buffer and an IBM Selectric-type keyboard with 19-key numeric pad.

Standard system software includes a disk operating system allowing a user to work with files including sequential or random file or record search.

Basic-Plus software interacts with the disk operating system and features sequential and random file access, assembly routine linking and logic operations, according to the spokesman.

The Model 1100 programmable hard-copy terminal utilizes the Qume Daisy Wheel printer. It reportedly has local text-editing capabilities and comes with an asynchronous interface, the Intel microprocessor and a communications port, he added.

Up to 8K of read-only memory (ROM) and 2K of random-access memory (RAM) expandable to 56K are intermixed to make the printer "look like" a data terminal, he explained.

In the Model 1200, ROM is reduced to 1K byte and the basic RAM is increased to 8K

or 16K, he said, adding the 1200 features dual floppy disk drives integrated with the 1100 terminal.

Software for the 1200 includes the disk operating system, a text editor called Letterwriter, communications and the Basic-Plus software, designed for applications

processing package, orienting it to the business office word-processing environment, ITS said.

The ITS 1000 products are capable of synchronous and asynchronous transmission at rates of 110-to 9,600 bit/sec, according to the spokesman.

Terminal Transactions

requiring off-line storage, he added.

The Model 1600 is a communications system incorporating 32K RAM, 1K ROM, a CRT terminal, a 55 char./sec Qume printer and dual floppy disks expandable to four.

In addition to software features of the Model 1200, the 1600 has a word/text-

The Model 1100 costs \$3,750; a basic Model 1200 with single floppy disk drive, disk operating system and the text editor costs \$7,800; and the basic Model 1600 communications system is priced at \$14,700.

ITS is at 398 Martin Ave., Santa Clara, Calif. 95050.

CRT for Meter Data

OMAHA, Neb. — Darco Management Systems has introduced a small data terminal designed for its industrial monitoring systems to display meter data and equipment status from remote locations.

The Mark I can communicate any four 6-digit functions including customer identification codes, volumes, flow rates, degree days, pressure or the performance of other industrial activities, the company said.

Two 6-digit meter readings plus transponder power or system tampering status can be displayed with one telephone call, Darco claimed.

The \$895 Mark I utilizes existing voice-grade lines to transmit data; the system operates through Bell-supplied Data Access Arrangement couplers in dial-pulse or tone-switching networks, he said from 268 N. 115th St., Omaha, Neb. 68154.

Interface Adapter Designed for Minis

PHOENIX — United Data Services Co., Inc. (UDS) has introduced a line of port adapters designed to bridge the gap between minicomputer current-loop interface ports and RS-232-compatible terminals.

The minicomputer interface adapter permits plug-compatible substitution of CRTs and other terminals for the Teletype Corp. Model 33, UDS claimed.

The unit adapts equipment with RS-232 voltage or 20mA current interfaces to a computer teletypewriter port, allowing simulation of the characteristics of the teletypewriter signal line interface, according to the firm.

To accommodate variations in the interfacing methods employed by different CPUs, there are two versions of the basic adapter, the firm said.

One version is a four-wire "passive" interface for use with computers which provide their own current loops, such as the Data General Nova and the Digital Equipment Corp., Hewlett-Packard and Interdata CPUs, a UDS spokesman said.

The terminal interface of either version will accept RS-232-compatible equipment or, when supplied with appropriate cable, can be used with 20mA current interface terminals, he said.

The adapter is supplied with a 16-foot computer cable, which includes a plug-compatible teletypewriter port connector, UDS noted.

The terminal interface on the adapter is terminated in a standard receptacle which mates with a plug on the RS-232 terminal data cable, the company said.

The adapter costs \$115, UDS said from 3024 N. 33rd Drive, Phoenix, Ariz. 85017.

Software in the can, can.

How to get the benefits and avoid the bugs of applications software-in Computerworld's February 28th special report.

If you were the world's only computer user you couldn't avoid in-house development of all of your applications software. But when your task is common, the applications software you need has likely been developed already and is being used in many installations like your own. So your mundane task -- and many more exotic ones -- are commercially available and "in the can". All you need do is find the right package at the right price, modify it a little (or a lot) to meet your standards, and you've taken a sizeable shortcut toward computer performance.

The number of users who've chosen to acquire their applications software this way has grown rapidly, for a variety of reasons. And *Computerworld's* February 28th special report will explore these reasons -- and the results. Edited by Don Leavitt, the report will include tutorials on applications software and experts' opinions on selection criteria. User experiences with applications packages will be emphasized throughout, and the attitudes many many users hold toward modification, with and without vendor support, will be reviewed. Many timesharing networks now sell applications software as an adjunct to their services, and we'll take a look at the savings that are possible with this service. In all, you'll find a wealth of information on applications packages in the February 28th *Computerworld*. So if you're a DP manager, programmer, or someone who's concerned about the productivity and cost effectiveness of DP, don't miss it.

If you're in the business of developing and marketing software packages, advertise in this special report. You'll reach more of your key market. Your *Computerworld* salesman can fill you in on the details of *Computerworld's* high yield. Or call Judy Milford at (617) 965-5800 to place your ad.



COMPUTERWORLD

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 475-8486

Portable Unit Works With T/S Net

Business Service Finds Printer Terminal a Necessity

NEW YORK — An independent business research, publishing and advisory organization here has no other alternative to utilizing a printing terminal.

Because Business International Corp. (BI) offers a service known as BI/Data which provides integrated international economics data to domestic and foreign businesses — and must make that data suitable for efficient mathematical calculations by its clients — it utilizes computers.

And, to communicate with the General Electric Mark III time-sharing service's computers in Ohio, on which BI/Data is based, the company has an in-house Execuport 3000 terminal made by Computer Transceiver Systems, Inc.

BI's staff here programs, accesses, updates and checks the operational status of its information base with the portable terminal

and a dial-up line, according to Pete Mikelson, assistant manager of BI/Data.

The firm gets its data from publications of the International Military Fund, a payments clearinghouse for non-Communist countries, the Organization of Economic Development and from United Nations publications, Mikelson said.

BI/Data supplies demographic, economic and labor data as well as recent estimates of population growth, gross domestic product data, industrial production and cost of living indexes, labor costs, exports and imports and exchange and interest rates.

For 35 countries, the system also provides forecasts of local business conditions and a table of historical data plus projections for the current and coming year for these variables, involving 150,000 numbers.

BI collects the information, makes estima-

tions, "fills the holes" and sends the information to the computer with the Execuport terminal at 30 char./sec, Mikelson said.

The portable terminal, Mikelson noted, is useful beyond its necessary capacities at BI's office here. It is also used for night transactions by members of the company's staff, who sometimes take the terminal home to access the data base, he said.

In addition, the terminal has proved useful in handling large forms because of its 136-column printout and forms-handling capability and, Mikelson said, the staff can travel to prospective clients' offices with it to demonstrate BI/Data's capabilities.

The terminal can also be used to capture 1,200 bit/sec communications when not printing, he added.

BI had an 80-column Execuport 300, as

well as a Texas Instruments (TI) Silent 700 and a smaller TI terminal, but it needed the wide forms-handling capabilities of the 3000, he said.

BI/Data clients also have terminals to access the Mark III system, but there are a few who can't or won't subscribe to the network. Information for these clients is obtained through the headquarters terminal and then sent to them in the mail, he said.

There are no terminal restrictions to the Mark III system, Mikelson added.

Tran TDM With Micro Handles Synchronous, Asynchronous Nets

EL SEGUNDO, Calif. — A microprocessor-based time-division multiplexer (TDM) from Computer Transmission Corp. (Tran) accommodates up to 16 asynchronous or synchronous digital data channels or any mixture of both types, the vendor said.

The M1318 Multitran can be used in point-to-point multiplexing between terminal clusters and central computers and is fully compatible with the company's M3200 network switching and management system, according to a spokesman.

The device supports variable mixes of remote job entry terminals, synchronous CRT terminal controllers and interactive asynchronous terminals over voice-grade or dedicated telephone lines, he said.

The M1318 can connect terminals via dial-up or dedicated modems, Tran short-haul data sets or direct EIA cabling, the spokesman added.

Incorporating a programmable microprocessor, the M1318 also provides "optimum multiplexing capability for small- to medium-sized networks," Tran said. The flexibility comes from a new program entered into the microprocessor which meets new synchronous and asynchronous channel allocation needs, the company stated.

Constructed with a single logic circuit board and a separate plug-in power supply, the M1318 provides maximum uptime and minimum maintenance costs because of the limited number of spares required, the spokesman claimed.

The byte-interleaved M1318 can handle asynchronous low-speed inputs at data rates of 75-, 110-, 134.5-, 150-, 300-, 600- and 1,200 bit/sec. It also can accommodate synchronous high-speed data rates of 1,200-, 2,400-, 4,800- and 9,600 bit/sec, he said.

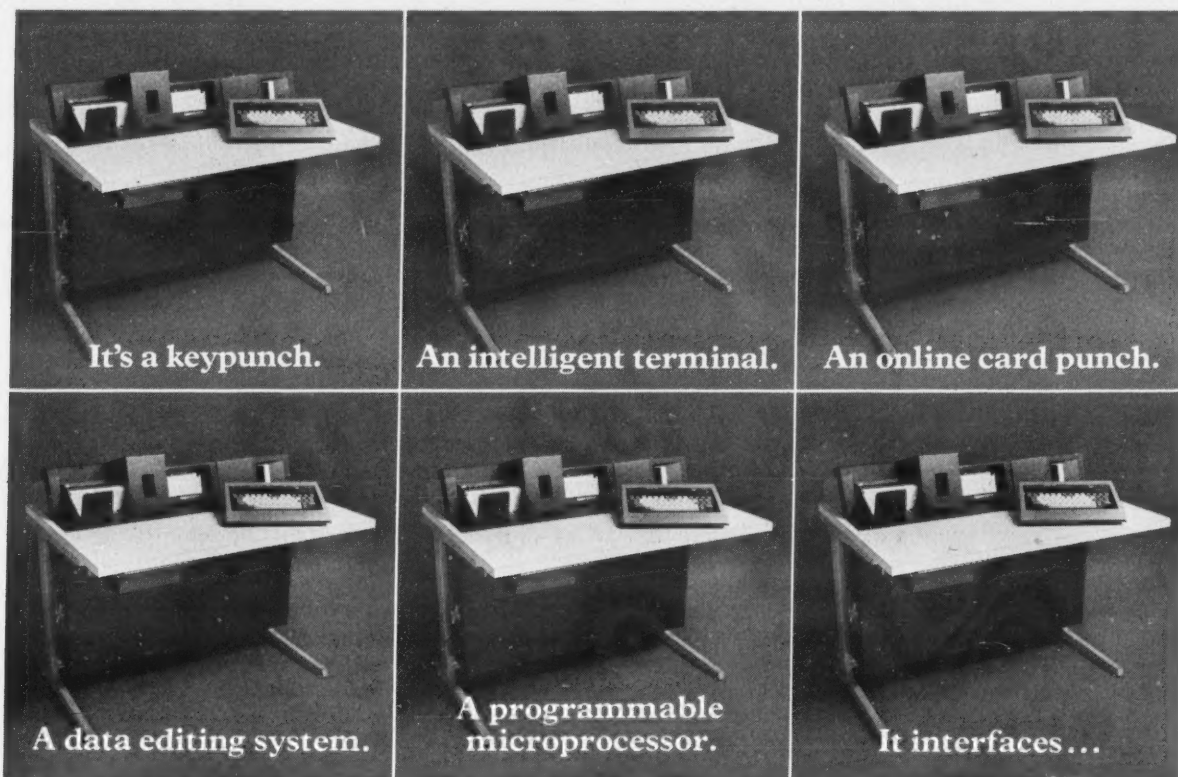
Interfaces for the high-speed trunk of the multiplexer are EIA RS-232C and CCITT V.24. For the low-speed channels, the interface is a two-channel module for either EIA RS-232C/CCITT V.24 or MIL STD 188.

This module provides visual indicators for the control functions Send Data, Receive Data, Data Set Ready/Data Terminal Ready, and Busy as well as a diagnostics capability consisting of a switch to perform remote loopback channel testing, the spokesman noted.

Automatic speed-recognition is supported as a standard feature for asynchronous channels.

When the M1318 is used to support a remote terminal cluster in an M3200 network, it operates as a dedicated synchronous channel until it reaches an M3201-2 data switch. The data switch demultiplexes and fills the requirements of the individual low-speed channels.

The basic M1318 synchronous/asynchronous TDM is comprised of the interface module, chassis, cabinet and power supply. A complete 16-channel, point-to-point multiplexing network between a terminal cluster and a computer center with mixed synchronous and asynchronous inputs, costs approximately \$10,000, the spokesman said from 2352 Utah Ave., El Segundo, Calif. 90245.



If your computer installation uses punched cards, your card preparation costs probably consume a higher percentage of your data processing dollar than they should. It's time you looked at the latest generation of card handling equipment.

Because a keypunch is no longer just a keypunch. Not if it's a Tab Product Model 501. We've used the latest microprocessor technology to meet all the input/output requirements of your card-oriented applications in a single economical unit.

Standalone, the 501 is a rugged, fully buffered keypunch, built for heavy duty commercial keypunch applications. And so quiet you'll know immediately that this is no ordinary keypunch.

But the 501 is much, much more. It communicates on-line with your mainframe CPU or minicomputer system. From the computer room or across the country on a dial-up line. So you can use it as an economical output card punch. And a data input and editing terminal.

The 501 can be all these things because it's not just another 'dumb' peripheral.

Programmability not only provides the data editing power you need at the source,

but gives the 501 the flexibility to change with your requirements. Just plug in a different PROM to add an editing feature, change your check digit calculation, or perform a special data input function unique to your application. All programmed—and supported—by Tab Products to your own requirements.

Until now, you had to change input media in order to experience the convenience and economy of distributed processing. And sacrifice the unique advantages the punched card provides for users throughout business and industry.

Sure, it's a keypunch. But it's a lot, lot more.

For more information, write or call Robert E. Nadal, National Marketing Manager, Tab Products Company, 2690 Hanover Street, Palo Alto, California 94305 (415) 493-5790



It's a Tab Products' 501.

TAB
PRODUCTS CO

At a time like this a slip-up can cost you plenty.

The same thing is true in high-density recording.

A lot of companies have found out the hard way that trying to use bargain-priced, uncertified computer tapes on today's high-density drives is no bargain after all. Sooner or later, the masking done with the GCR format will catch up with you. Ask your Graham product technology man to explain.

That's why Epoch 4 is so important in an upgrade. For just 6¢ a month per reel you get tape that's certified error-free.

If you're getting into high-density equipment, better get Epoch 4.



**GRAHAM
MAGNETICS**

Graham, Texas 76046



Service Provides On-Line CRTs to Customer Banks

WINSTON-SALEM, N.C. — A large banking industry service bureau headquartered here provides its customers with terminals so the banks can avoid the expense of a mainframe and the personnel to program, operate and maintain it.

Wachovia Services employs two NCR Century mainframes here; Applied Digital Data Systems, Inc. (Addis) Consul 880A terminals are located in all the banks it serves.

"Our on-line system gives each institution a complete profile of its

customers," according to Jim Hamrick, Wachovia's president.

"Each one of a customer's accounts — including checking, savings, certificate of deposit and installment loans — is recorded in a single file.

"This simplifies business operations because funds transfers or loans can be accomplished in one step," Hamrick said.

Wachovia's customer profiles also provide a marketing aid by pinpointing additional useful services for each bank's clients, he added.

To access the information, the 880As are operated on-line. Through them, Wachovia's customer banks can query every-

ing.

Wachovia chose the pollable 880As after what Hamrick indicated was thorough on-site test-

viding a system to so many different banks, and when the system goes down our 'hot line' rings off the wall," he explained.

Good Vendor Response

Although there are indications of normal equipment failures, Bill Prince, who provides service for the bank-site equipment, said the vendor's response is excellent.

"When a unit goes down, it takes one phone call and then a replacement part is on the way," he said.

Wachovia also maintains a staff of programmers who oversee the system's software to provide customer banks with up-to-date DP, Hamrick said.

And the service bureau installed all the terminals and telecommunications equipment needed to place the bank on-line, he said.

Executives Gain Informer Device

LOS ANGELES — Business executives can access their business computer operations with the Model I-301 CRT/keyboard terminal from Informer, Inc.

The desktop data entry/inquiry terminal reportedly can be connected directly to a minicomputer or tied into telephone lines for remote applications, Informer said.

Key Spacing Close

Keyboard key spacing is slightly closer than normal, the company said, adding the I-301 screen displays up to 512 characters.

The unit utilizes an RS-232 interface and can operate at switch-selectable rates of 110- to 9,600 bit/sec in half- or full-duplex modes, according to a spokesman.

The I-301, which has special keyboard controls to ensure privacy of system contents, costs \$1,850, he said from 8332 Osage Ave., Los Angeles, Calif. 90045.

IBM Enhances 3776 With Form Feature

WHITE PLAINS, N.Y. — IBM is offering a forms-feed feature which is said to provide the IBM 3776 terminal with front or rear paper insertion facilities.

The 3951 front-feed feature is designed to simplify form changes, improve overall job time by reducing set-up times and extend the paper supply height, IBM said.

The forms stand/stacker enclosure continues to be a standard on 3776s with or without the 3951, which costs \$400.

Monthly plans are also available for the 3951, IBM said from 1133 Westchester Ave., White Plains, N.Y. 10604.

Terminal Transactions

thing from a name and address to a complete client history.

The terminals are also used by the banks to update their account files; currently, more than 150 terminals are installed at the service bureau's customer sites, Hamrick

ing.

Wachovia's vice-president in charge of operations, Hank Forvendel, said he was "very pleased with the reliability of the terminals.

"It's a large responsibility, pro-



Dear Ma:

While you've been painting telephones and calling on Congress ...guess what Vadic's been doing?

This clipping tells the story. Vadic has come up with more low and medium speed modem "firsts" than anyone — both for OEM's and end-users.

A prime example. Almost 4 years ago Vadic invented a full duplex 1200 bps modem that operates beautifully on either dial-up or 2-wire leased lines. Today, over ten thousand VA3400's are in use at over 1000 companies.

We increased the speed of our CRT's and other 120 cps terminals by four times when we replaced your 103's with VA3400's. And it took just a few minutes to change computer port speed.

You can't beat Vadic for service, either. General Electric installs and maintains Vadic modems at over 50 locations nationwide. And Vadic backs this up with 5 regional on-line diagnostic centers.

Better send for Vadic's 30 page brochure, Ma. It'll give you some young ideas.

Your independent thinking son,

Alexander Graham Jr.

PS: Vadic has shipped over 125,000 modems to date.

DATA COMM NEWS VADIC "Firsts"

1969 — Vadic designs complete OEM line of low cost Bell compatible 300 & 1200 bps modem modules & PC boards for terminal & computer systems manufacturers.

1970 — Vadic adds IBM & CCITT compatible modems.

1971 — For end-users, Vadic introduces 16 channel system where up to 16 modems & auto dialers can be freely intermixed in 7" high chassis.

1972 — Vadic adds powerful displays & diagnostics, including EIA interface status lights, and local/remote loopback, making it simple to pinpoint problems on any part of a complex data communications system.

1973 — Vadic announces world's first full duplex 1200 bps modem that works on dial-up or two wire leased lines. Called "the most significant advance in modem design in years".

1974 — Vadic designs system which permits 60 modems to share a single automatic dialer. Vadic introduces 2400 bps modem.

1975 — General Electric now installs, leases & services Vadic modems at 50-plus service centers in US. 100,000th modem shipped by Vadic.

1976 — Vadic is first modem manufacturer to obtain certification for direct connection to switched network in California eliminating need for Bell DAA.

vadic

Member of IDCMA

THE VADIC CORPORATION
505 E. Middlefield Rd., Mountain View, CA 94043
Tel: (415) 965-1620 TWX: 910-379-6567

Write or phone for your **FREE** Ma Bell Poster... suitable for framing.

Decprinter

LA 180
\$2,645

Decwriter

LA 36
\$1,610

Southern Sys., Inc.
201-725-0700
305-528-5228

Operations Management — Part 1

Broadening Scope of DP Seen Changing Manager's Role

By Louis Fried

Special to Computerworld

What is the present role of the data center manager?

What will be the future of the data center?

What must the manager do to assure future success?

These questions were raised in a panel discussion at a recent meeting of the Computer Operations Managers Association (Coma) in the San Francisco Bay area.

The conclusions reached should prevent any operations manager from becoming complacent about his current role and position.

The current role of the operations manager compares closely with that of a manufacturing plant or production shop.

In daily operations, his responsibilities include complex job scheduling, managing activities to meet schedules, determining the cause of error on production runs, accommodating schedules to perform reruns, controlling input, output and inventory and coordinating special jobs.

He is also responsible for maintaining equipment and media, managing an increasingly complex combination of data conversion, telecommunications and DP as well as report publication facilities and personnel management.

The operations manager is on the front-line of customer relations in dealing with user complaints and attempting to maintain the good will of the users.

There is also the task of vendor relations to assure proper service, equipment maintenance and a flow of information on new equipment.

Planning Activities

In addition to the above, the operations manager is called upon to perform a whole range of planning activities which include computer performance measurement, analysis of equipment requirements, analysis of supplies requirements, hardware evaluation and selection. Further, he must review systems designs, review and approve program operating documentation, allocate costs to users, analyze internal efficiency, plan improved use of the computer as an operations management tool and give attention to career planning for personnel, budgeting and facilities planning.

Even at today's level of responsibility, the role of the operations manager demands a higher level of business and academic background than it did a few years ago.

We have already reached the point at which a B.A. in business or in computer sciences is almost mandatory for this position and, in larger installations, an M.A. degree is often specified.

The operations manager is responsible for 55% to 65% of the DP budget and bears a major responsibility, in many companies with on-line systems, for the successful

operation of the production or service activities of the company.

This, of course, raises a significant question for operations managers. Why, for the most part, are their pay scales lower than those of systems or programming managers?

Recent developments in the technology of DP make it reasonable to forecast that the data center environment will undergo substantial modifications within the next five to 10 years.

The price/performance ratio for both large and small computers will continue to improve.

The size of both CPU and memory will shrink while capacities increase. Newer CPUs and memories will require less power and air conditioning.

As more functions are put on integrated circuits and cards, maintenance costs will

be able to stabilize and the time necessary to recover from a failure should drop.

The demand for on-line data bases will continue to increase, but new devices will reduce the cost per byte of secondary storage.

Mass memory devices with higher

This is the first in a series of articles on the changing role of operations management.

capacities and transfer rates are already appearing.

Magnetic tape media will continue to be used where portability is needed, but will increasingly become a media for archival storage as electronic (rather than electromechanical) multibillion bit memories reach the market.

This combination of factors will eliminate most of the tape mounting and pack chang-

ing that currently occupy the time of computer operators.

The science-fiction idea of a single console operator running the computer room is not too far away.

The trend toward distributed DP will have a major impact on the data center. Networks composed of communications lines and mini (or midi) computers linked to the data center computer will take over more and more of the actual processing of data.

Input functions will move almost completely into user hands, eliminating the "keypunch section." Input activities will move to minicomputers that support data entry prompting, interactive data entry, file interrogation and data capture associated with text editing.

These same minicomputers will drain output activities from the data center by providing for remote printing and acting either as conduits for terminal inquiry to a central data base or as local data base management facilities.

They will also use a data center computer (on an RJE-type basis) for overload processing or performing DP activities too large for their internal capacity.

For the data center, this means less and less control over what is being processed at any given time. Scheduling of the data center computer will become increasingly difficult.

Performance measurement and the resulting equipment specifications will concentrate on meeting peak loads and supplying certain levels of computer capacity rather than on scheduling methods that permit load leveling to the existing capacity.

The net result for the operations manager is that the role will change from that of a "production shop manager" to that of a "resource manager."

CLA Names 'Executive of Year,' Cites Four 'Exceptional Achievers'

WASHINGTON, D.C. — Robert W. Strong, manager of management information services at Brockway Glass Company, Inc. in Brockway, Pa., has been named "Executive of the Year" by the Computer Lessors Association (CLA).

Four other DP professionals were cited for "exceptional achievement" in DP management by the group.

They include Lewis J. Bohache, assistant vice-president, Farmers Insurance Group, Los Angeles, Calif.; Tom Braswell, assistant vice-president and corporate director of DP, Genuine Parts Co., Atlanta, Ga.; Tom Crosby, manager of computer services, Amana Refrigeration, Inc., Amana, Iowa, and Brian P. Doran, general manager, Transportation Teleprocessing Systems, Inc., Jacksonville, Fla.

The awards are based on outstanding DP achievement with emphasis on price/performance, efficiency, economy and corporate effectiveness in the operations managed by the nominated candidates.

Strong joined Brockway in 1946 and founded the firm's DP department at a time when annual sales totaled only \$9 million.

About 30 years later, Brockway is a Fortune 500 company with sales in excess of \$390 million and a DP department handling many millions of characters of information daily for sales offices and plants across the nation.

Strong has saved more than \$2 million since 1967 by obtaining computer equipment from third-party leasing firms.

Today he has an IBM 360/50 system with eight 3330-type disks running under Ex-

tended DOS (Edos) along with a second leased 360/30 disk system at a branch location.

A believer in multivendor systems for maximum economy, Strong operates non-IBM terminals, non-IBM disks and non-IBM software (Edos) — all in a remote part of Pennsylvania far removed from the major metropolitan areas.

In 1964, Brockway's sales totaled \$130 million, and Strong's DP budget was \$780,000. In 1975, when sales had tripled, his budget was not quite double, only \$1.5 million.

Two Versatec Electrostatics Challenge Pen-Type Plotters

SANTA CLARA, Calif. — Versatec has introduced two electrostatic plotters designed to "supplement or replace pen plotters," according to the firm.

The units are 30 to 100 times faster than the pen-type units, Versatec claimed.

Both produce 36-in. wide E-size drawings, with the Model 8136 operating up to 2 in./sec. and the Model 8236 running at .75 in./sec.

The 8236 has 200 dot/in. resolution; the 8136 has half that resolution.

The units plot a raster of data across 35.2 in. in one scan. They can shade, tone or draw variable line widths with a single com-

mand and they can produce continuous plots up to 500 ft in length, Versatec said.

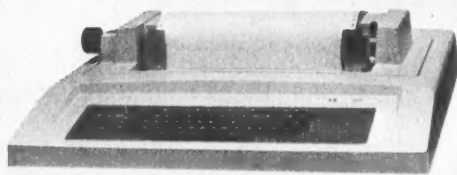
Versatec controllers are available to link the plotters with IBM 360 or 370 models as well as other mainframes.

An IBM 360/370 plotting system controller converts conventional pen plotter data to rasters for electrostatic plotting with reductions in CPU time, core memory and I/O transfer, according to the firm.

Prices range from \$25,000 for the 36-inch plotter with 100 dot/in. resolution to \$34,500 for the 36-inch unit with 200 dot/in. resolution and character generator.

Versatec is located at 2805 Bowers Ave., Santa Clara, Calif. 95051.

ONE CALL GETS 'EM ALL.



DECwriter II (\$59.50 per month)
Most popular impact printer
• 132 columns, fully adjustable
• Full ASCII upper/lower case
• True 30 cps throughout

Texas Instruments Model 745 (\$75.00 per month)
Portable—lightest, quietest thermal printer. Also 735, with 743 & 733 KSR & ASR.



Diablo 1620 (\$105.00 per month)
Typewriter-quality impact printer. Graphics capability. 45 characters per second.

CHICAGO AREA: (312) 298-0777
SO. CALIFORNIA: (213) 641-2001
NO. CALIFORNIA: (415) 563-7155
ALL OTHER AREAS: (312) 694-3777

Best, most efficient terminals, at lowest lease rates available with one call. ADDS 580 and 980 CRT's — among the most reliable. Also: Lear Siegler ADM-1, -2 and -3; Data 100 and Tally line printers; Techtran Data-cassette Storage — and many more.

ICE can be your single source — with a single call. Flexible leasing and purchase plans. With complete ICE or factory service.

Call us today.

ICE INTERNATIONAL COMPUTER EQUIPMENT, INC.

Other offices in: New York, Boston, Detroit

Switch to Key-to-Disk Net Brings Brace of Benefits to Steel Firm

MIDDLETOWN, Ohio — Armco Steel Corp. here switched its data entry operation from punched cards to a key-to-disk system three years ago and found a savings in money and labor plus increased productivity and reduced errors, the user said.

Armco employs 48,000 people in its steel-making, metals fabrication and mining organization and other diversified operations. Total worldwide sales are over \$3 billion.

The firm installed a Data 100 Keybatch system in December 1974, replacing an IBM 360/20 system and seven IBM 029 and 059 keypunch/verifiers.

The company was looking for greater economy and more flexibility in the data entry area and wanted to accomplish data entry operations that would have been difficult to achieve with card equipment, ac-

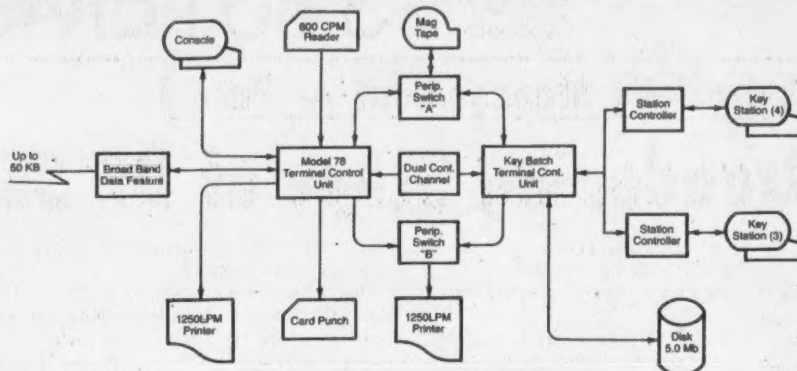
cording to Wendell Dennis, supervisor of computer operations.

The current system consists of a dual-controller Model 78 Keybatch system installed in the firm's general offices. Attached to the Keybatch portion of the system are seven CRT keystations used for data entry, an 800 bit/sec magnetic tape drive and a 5M-byte cartridge disk.

Connected to the Model 78 controller are two 1,250 line/min printers, a CRT console and a card reader and punch.

The card equipment is used for certain smaller jobs that do not lend themselves to key-to-disk entry, the firm said. A peripheral switch between the two controllers allows going directly to the printer from the Keybatch or directly to the host computers.

The system is connected over a 50 kbit/sec line to three host computers, also in



Armco Steel's Data Entry System

Middletown: two IBM 370/168s and a 370/158.

The system is used to process about 600 application programs. A few of the larger jobs include invoicing for customer orders shipped from steel plants, stockholders' dividends, a retiree payroll for about 10,000 people and the 2,000-person general office payroll, which includes the company's

headquarters and sales offices around the country.

The terminal system also provides data entry/output for sales analysis reports which are generated from invoices.

The operating software is IBM's OS/MVS. About 70% of the application programs are written in PL/I, with the remainder in Cobol and Assembler.

The Keybatch system is operated two shifts a day, five days a week, while a Model 78 remote job entry terminal is operated around the clock five days a week.

The number of batches submitted per day is about 85. Data entered through the keystations is first stored on the cartridge disk, then transmitted via the Model 78 to the host computer.

Transmission to a particular file is directed by JCL, which is stored on the cartridge disk and transmitted before the batch of data to be processed. Output is received through the Model 78's two printers.

Formatting Capabilities

A principal reason for the increased efficiency achieved by Armco in its data entry operation has been the formatting capabilities of the Keybatch system, the firm said.

Under software control, as many as 999 input formats are permitted, with each input format permitting as many as 99 format levels on each job-in.

For example, one accounting system has about 75 format levels available with one job-in. According to Dennis, in one pass through all documents the operator can key in any format level without wasted keystrokes.

As soon as the operator keys in the code to define the record, the system brings in the format for that record, with no manual intervention required and no slowing down of the data entry process, he said.

Keying in one format at a time, the operator might be required to go through the input data 75 times, he noted.

Another example of savings in keystrokes in accounts receivable processing concerns the debit and credit record system for customers who overpay or underpay their accounts. Under the former punched card system, each customer record had to be keyed twice, once for a credit and once for a debit for any change in the account.

Now the record is keyed just once and, through the arithmetic capability, two output records are generated, a debit and a credit, by changing the sign of the amount field at output time, Dennis explained.

Along with the saving in keystrokes and greater simplicity is improved accuracy, he said. Built into the software are certain limitations, a range of illegal and legal values and specifications for a certain keystroke, which ensure errors are caught before they ever get into the full entry stage.

Armco uses the Keybatch software Modulus 10 check-digit algorithms in one major application to check a customer's numbers. The system eliminates the need to manually verify all nine digits, further cutting down on keystrokes.

The result has been more records per hour, fewer people required for data entry and significantly fewer errors, Dennis said.

Taking into account system cost and the greater efficiency that has been achieved, the company is probably saving about \$1,000/mo over the former keypunch system, he estimated.

For Shulman Transport, a data system that delivers:



INCOTERM.®

More than half a million pounds of freight are moved by Shulman Transport Enterprises on an average day... by road, sea and air... throughout the world. Approaching \$100,000,000 in annual revenues, Shulman is one of the fastest growing companies in the freight forwarding business.

The part of the business that grows the fastest of all is the labor-intensive paperwork needed to move freight.

To meet that challenge, Shulman designed an advanced, transportation-oriented computer facility for corporate headquarters in Cherry Hill, N.J.

But how could they put that computer power to work on the front lines? Where the action is... on the street... with the driver making freight deliveries?

Shulman turned to INCOTERM.

To capture data where the paperwork originates. To cut down the pieces of paper needed. Keep track. Improve service. Get the waybill to the terminal before the freight rolls in.

Shulman's INCOTERM system combines on-line administrative communication and on-line transmission of waybill data. The mainframe computer at Cherry Hill dispatches error free waybills to destination points. At the same time, it picks off needed information for invoicing the customer, and a variety of other management and customer service functions.

If you'd like to know more about how INCOTERM delivers for Shulman—and can help you as well—please call or write.

More power
to your
terminal.



INCOTERM
CORPORATION

65 Walnut Street, Wellesley Hills, Massachusetts 02181 Telephone (617) 237-2100
Sales and customer service offices in major cities throughout the United States and abroad.

The New STC 8350:

The only thing that's not compatible with the IBM 3350 is our low price and fast delivery!

Compatibility:

The STC 8350 Disk Unit is totally performance and software compatible with the IBM 3350.

Just connect it to an IBM ISC on any system 370/145, 148, 158 or 168.

Or connect up to four strings of eight STC 8350 Disc Drives to an STC 8000 Disk Control Unit.

Lease Prices:*

Unit	1 Year	2 Years	3 Years
8350 Model A2	\$1,363	\$1,250	\$1,200
8350 Model B2	\$1,090	\$1,000	\$ 960
8350 Model C2	\$1,420	\$1,300	\$1,250
Dual Path	\$ 88	\$ 80	\$ 78
Fixed Head	\$ 327	\$ 300	\$ 288*
Primary Controller-Adapter	\$ 11	\$ 10	\$ 9

*Purchase prices permitting even greater savings are available upon request.



Delivery:

First customer shipments are being scheduled for March, 1977.

STC's advanced technology... You'll be hearing more from us.

Gentlemen:

- ☐ Send complete information
- ☐ Have your representative call

NAME _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____
ZIP _____
PHONE _____

or call toll free

800-525-2940

Ext. 2096, Tom Purtell



STORAGE TECHNOLOGY CORPORATION

2270 South 88th Street
Louisville, CO 80027
303-666-6581

**To the data processing
executive who wants to
work smart, not hard:**





If you want to work smart, you need a computer that does the same. One that's flexible enough to do things your way. Which means being able to run current applications written in standard languages like ANSI '74 COBOL and RPG II without a major conversion effort. And being able to develop new interactive applications with a CODASYL-compliant Database Management System that uses exactly the same file structures and works with exactly the same operating system as all other applications—again, so there are no compatibility problems.

This is the kind of computer Prime offers. A whole family of them in fact, designed to make the development and day-to-day running of interactive data processing applications easier and less costly than ever before.

They are no-risk systems that adapt easily to your established data processing standards and procedures. They communicate directly with a wide variety of edp mainframes by emulating RJE protocols such as 2780, HASP and UT-200. They are programmed with the same languages your staff is already familiar with. And you can expand and upgrade them with incredible ease. Prime systems can handle up to 63 terminals simultaneously, can have up to eight million bytes of main memory, over 2.4 billion bytes of disk memory and virtual memory per user of 512 million bytes.

Typical systems for database management applications range from \$100,000 to \$350,000, or about \$2,170 to \$7,600 per month if you lease them directly from Prime. In other words, edp mainframe functionality at less than one-tenth the price.

For more information about our smart alternative to working hard, contact Joe D'Angelo, Marketing Manager, Prime Computer, Inc., 145 Pennsylvania Avenue, Framingham, MA. 01701, (617) 879-2960.

PRIME



Prime can help

Mini Bits

IBM 3 Users Incorporate

LOWELL, Mass. — The New England System 3 Users Group, a non-IBM-affiliated organization not open to vendor membership, has incorporated. The group has been in operation for five years, according to a spokeswoman.

The group, with over 200 member companies, conducts meetings the third Wednesday of every month except August and December. Professional speakers on varied topics in general management and IBM 3 technical topics address the group, she said.

Membership is \$15/year per company. Further information is available from Joseph Quartarone, Lowell Shoe, 95 Bridge St., Lowell, Mass. 01852.

Charles River Data Offers Add-On Floppy for LSI-11

WALTHAM, Mass. — The FD-11/L dual floppy disk add-on for the Digital Equipment Corp. LSI-11 microcomputer is available from Charles River Data Systems, Inc.

The unit provides a formatter and interface on a single card which plugs into the processor's small peripheral slot, the firm said.

The add-on is software-compatible with DEC's RX-11 instruction set, features 6 msec track-to-track access time and includes write/protect switches, a spokesman stated.

The FD-11/L costs \$2,750 from 235 Bear Hill Road, Waltham, Mass. 02154.

Memorex Designs OEM Floppy With IBM Compatibility

SANTA CLARA, Calif. — Memorex Corp. has an IBM-compatible floppy disk drive designed for OEMs configuring data entry and small business systems.

The Model 550 provides a recording capacity of up to 800K bytes of unformatted data or 243K bytes in the IBM 3740 format, according to the firm.

With an appropriate controller, the drive can be operated in double-bit density mode without modification, a spokesman added.

The unit is lighter in weight and smaller in overall size than traditional drives, Memorex claimed.

Four drives can be mounted vertically or two horizontally in a 19-in. rack. A drive select feature allows two or more 550s to be connected and operated in either radial or serial mode, according to the spokesman.

A lock/stop feature prevents closure of the cartridge door if it has not been fully inserted or removed.

Users can optionally add a second index transducer to the unit to allow recording on the reverse side of a disk when it is flipped over.

Memorex would not release prices for the unit. The firm is at San Tomas at Central Expressway, Santa Clara, Calif. 95052.

Basic/Four Adds Matrix Printer

IRVINE, Calif. — Basic/Four Corp.'s Model 3510 300 line/min matrix printer features a standard 96-character upper/lower case character set, the firm said.

The printer can be used with all Basic/Four systems, the company stated. It can process a large volume of forms and also has graph plotting capability, a spokesman added.

Users can select either 6 or 8 line/in. Double-height characters can be produced for report titles on forms up to 16-in. wide, he said.

The Model 3510 costs \$11,900 or \$262/mo on a 66-month lease plus maintenance plan. Basic/Four can be reached at P.O. Box C19550, Irvine, Calif. 92713.

Burroughs Fills CPU Gap

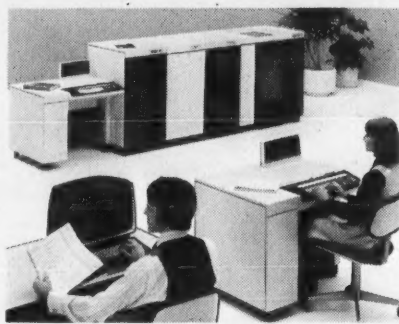
B800 Provides Twice B700's Power

By Esther Surden
Of the CW Staff

DETROIT — Burroughs Corp. has introduced the B800 to fill the gap between the firm's B80 small business system and its B1800. The B800 is the successor to the B700 system and is said to provide up to two times the processing power of the B700.

In the range of the Digital Equipment Corp. Datasytem 350, Basic/Four Corp. 350, NCR 8200 and Century 50 and the IBM 3, the system was designed for both business and distributed processing applications, according to a spokesman.

Two B800 models were announced. The B810 operates at 1M cycle/sec and has a 32K-byte MOS memory with a 500 nsec access time for two bytes of data, Burroughs said. It can be expanded to 128K bytes.



Burroughs B800

The B820 has 16K bytes of MOS memory and a faster 16K-byte bipolar control memory, the vendor said.

Library 'Checks Out' Inventory With OCR Wands Linked to CPU

By Mal Stiefel

Special to Computerworld

E. BRUNSWICK, N.J. — The municipal library here has installed an on-line book circulation and inventory system which uses hand-held optical character recognition (OCR) wands tied to an IBM 3/15 at the township's DP center next door to the library.

The system, which began operating last October, supports circulation (checking materials in and out), inventory, ordering and renewal functions for the library. Staff personnel can retrieve the status of a library cardholder or renew a book over the phone.

The counter clerk is notified by a CRT-displayed message when a book or other item being checked in is overdue or has been reserved by another library patron.

The system prints overdue notices and reserve notices every day on specially designed mailer forms, and it prints index cards for each item added to the holdings.

In addition, it generates monthly management reports including utilization statistics by patron types (in-town or out-of-town residents) and by subject category (fiction, sports, biography).

A yearly report of inactive items will be used by the librarians to evaluate the holdings and cull unwanted material from the inventory.

Checking is facilitated by use of the Model P130 OCR wand from Recognition Products, Inc. of Dallas; the wand reads OCR-A font characters from labels pasted on the books and from new plastic cards issued to all patrons by the library.

When the wand is passed over a patron's card, the system reacts (usually in 3.5 seconds) by displaying the patron's name, address and status on the CRT. Similarly, the book title is displayed when the wand is passed over the label.

Patrons seem to enjoy the feature, according to library director George Happ. It gives them confidence in the accuracy and reliability of the system, he said.

Transactions are captured on diskette so the circulation function can operate even if the computer is down.

The library cards, designed by RD Products of Victor, N.Y., were designed to be compatible with the existing manual Gaylord system. The Gaylord imprints can accept the reversed, upside-down raised characters on the new card in place of the metal slug on the familiar library card used throughout the country.

With Gaylord compatibility, the cards are expensive — 50 cents each — but they can be used in manual systems at a dozen other libraries in nearby towns where East Brunswick patrons also enjoy borrowing

privileges.

The system, which cost \$28,000 to develop, includes three IBM 3277 CRTs, two wands and the Total data base management software package from Cincom Systems, Inc. for random access to the files.

Applications programs were written in RPG-II over a six-month period by the township's DP staff, which was also supporting other municipal maintenance and development projects at the same time. Three people participated in the development effort.

In one month, new Mylar-coated Avery labels were typed for each of the 70,000 items in the inventory. The entire staff was mobilized over the Labor Day weekend to attach the labels to the books.

New library cards were issued to all 20,000 patrons during a registration period to complete the conversion task.

Wand Burns Out

Shortly after the system was declared operational in October, the prototype wand, which had been used for testing, "blew a circuit" in an accident that also

(Continued on Page 37)

The control memory reportedly features a 70 nsec access time for two bytes of data.

The B820 processor, which is also expandable to 128K bytes, operates at 2M cycle/sec, the spokesman added.

Both systems are object code-compatible with the B700; all application programs can be transferred from that system to the B800, Burroughs claimed.

The B800 is also said to be program-compatible with both the B80 and the B1800 via Computer Management System operating and application software.

Memory access for the B800 is controlled via a microprocessor called a Direct Memory Access Control (DMAC). The DMAC allows the disk I/O control and data communications processor to share memory cycles with the main system processor and controls the priority of access for the three sources, Burroughs said.

To facilitate the system's use in communications applications, Burroughs is offering a data communications processor for the B800 that reportedly accommodates transmission speeds up to 9,600 bit/sec and broadband speeds of 64 kbit/sec.

The operator console for the system can either be a 120 char./sec matrix printer or — for the first time in a Burroughs system of this size — a 256-character Self-Scan display. Both consoles have alphanumeric keyboards.

Fixed disk drives with capacities of 9.4M-, 18.8M-, 28.2M- and 37.6M bytes and an average access time of 55 msec have also been added to the system to complement other disk offerings. Up to two drives can be accommodated, the spokesman said.

In addition, up to four removable disk pack drives with capacities of 65.2M- and 130.4M bytes and a 33.3 msec average access time can be attached to the B800.

A basic B800 with 64K bytes of memory, 120 char./sec printer console and 4.6M bytes of cartridge disk costs \$35,900 or can be leased for \$1,073/mo.

A typical B820 system with 64K bytes of memory (16K bytes of which is a 70 nsec bipolar control store), screen-based console, data communications processor, 4.6M bytes of cartridge disk, 160 line/min printer and TD 734 terminal costs \$50,400 or \$1,505/mo, Burroughs said from Detroit, Mich. 48232.

System Sitting at Finish Line Speeds Results of Club Marathon

DALLAS — When the dust settled at the White Rock Lake Marathon here last month, there was no doubt about the race's winner because the results were tabulated at the finish line by a small business system.

With a time of 2 hours, 15 minutes and 11 seconds, the winner, Jeff Wells, clipped off more than five minutes from the old record in the event sponsored by the Aerobics Research Center and Cross Country Club.

The applications programming for the effort was developed by analysts at Aerobics and the mobile equipment to run the applications was donated by Datapoint Corp., according to Steve White, systems analyst.

The marathon promotes Aerobics' dedication to progressive and scheduled exercise to avoid or avert cardiovascular disease. The programming for the race was done in a lab that maintains a data base to track a group of people over a period of years to determine the beneficial effects of exercise on heart disease, White explained.

"The lab does not do any research itself," he noted, but receives the medical information and computerizes it. The real number-crunching types of statistical operations are taken care of by an IBM 370/158 at the

University of Texas Regional Computer Center.

The data is batched over 2,400 bit/sec lines to the center, he added.

The configuration at the lab includes a Datapoint 5500 with four 25M-byte disk drives running in dual partition.

"The people who were making the plans for the marathon thought it would be nice to have a computerized results system," White explained. Aerobics originally talked about having terminals at all the checkpoints, "but with setting up phone lines and needing modems, this was much too costly for a one-time event," he said.

"We thought we could probably come up with a finish-line scoring system and we decided to work toward that."

Three 3600 data stations connected to a 5500 with a 600 line/min printer were used on the day of the race. The system produced printouts with a breakdown by preassigned race classes such as female open, males 64 and over and males 16 and under.

The system kept working and even recorded the last person to cross the finish line — at a time of 5 hours, 5 minutes.

first class
permit no 40760
newton ma

BUSINESS REPLY MAIL *no postage stamp necessary if mailed in the United States*

postage will be paid by



COMPUTERWORLD

**797 Washington Street
Newton MA 02160**

CIRCULATION DEPARTMENT

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

**USE THE ATTACHED
ORDER FORM AND
THIS ENVELOPE FOR:**

- ☐ *a new subscription*
- ☐ *new address*
- ☐ *new title*
- ☐ *new industry*

Order form is attached through binding. Be sure to include current label or label information when making a change.

Gemini Has Interdata-Based Turnkey

ENGLEWOOD, Colo. — Gemini Information Systems, Inc. has a turnkey system based on the Interdata, Inc. 6/16 and 7/32.

The 6/16-based system features 65K of memory, a console operator's terminal, 25M-byte disk system, 400 card/min reader and a 200 line/min printer.

The system also includes a software package which features OS/16MT2, Fortran IV and Gemini's Data Demon (a data base management and query system designed especially for minicomputers).

An accounting system designed to assist the accountant in recording transactions, compiling reports and

summaries is also included.

The 7/32-based system features 128K of memory, an 80M-byte disk system, 800- and 1,600 bit/in. magnetic tape system, 600 line/min printer, a 400 card/min reader, and a four-terminal interface.

Software Included

It also includes a software package consisting of OS/32MT, Fortran V, Cobol and the Data Demon.

The 6/16-based system costs \$43,500 and the 7/32-based system costs \$85,500.

Gemini is at 5650 S. Syracuse Circle, Englewood, Colo. 80110.

Capability Lets GRI System 99 Interface With Remote 3741s

N. BRUNSWICK, N.J. — GRI Computer Corp. has enhanced its System 99 minicomputer-based small business system with the ability to attach remote IBM 3741s to the system, a spokesman said.

The communications capabilities allow users to link the 3741 data stations to the system. Transmission rates of up to 4,800 bit/sec to and from the remote key to diskette batch data systems are accommodated.

Two Access Methods

Supported by GRI's communications control language, users are said to be able to access the 3741s interactively or by a command which activates disk-stored communications control streams.

They can be accessed either manually or in an unattended dial-up operational mode,

GRI noted.

Up to three synchronous ports can be concurrently supported on a 64K-byte System 99 with any port accessed from any partition of at least 14K bytes, the firm added.

No Wait for Transfer

The enhancement allows users with IBM 3741s in remote offices or warehouses to process batch data on the central office's System 99 without waiting for manual diskette data transfer between remote sites and the main office, the company stated.

The communications package includes the synchronous interface, a modem control unit and the communications control language software. The package is priced at \$4,335 from GRI at 870 Georges Road, N. Brunswick, N.J. 08902.

Library Links OCR Wands, CPU

(Continued from Page 36)

knocked out one of the 3277's.

According to Happ, a card reader adapter which used a cable connector identical to the OCR wand connector should have been removed because the library decided not to hook up the card reader. But the adapter was left in place.

Then, inadvertently, one of the library employees plugged the wand into the adapter socket instead of the wand socket, shorting the 3277 power supply and damaging the wand.

Wand repair by Recognition Products took six weeks. During that time, the circulation function was running in hybrid mode: About half of the books were checked out with the old manual Gaylord system; the others were handled by keying data directly into the computer via another 3277.

With the wand back at the repair shop, there was a bit of a queuing problem at the library circulation desk, Happ indicated, with the book volume approaching 1,200/day. The desk jam was relieved, however, when the wand was returned.

In the backup operation, keying was done through the 3277 until the lines started to build up at the circulation desk. Then the manual system was used until the congestion was reduced, Happ explained.

The prototype wand worked reliably and quickly during the test period, and it has been operating properly since it was repaired. (The card reader adapter has been removed.)

Two production versions of the P130 wand are expected to be delivered shortly.

The project began in January 1975, when management predicted a significant jump in business after the library's planned move into new quarters late in 1976. Transaction volume rose to 300,000 items in 1976; traffic is expected to increase another 50% in the next few months, Happ said.

With such a growth rate, the administration felt compelled to seek ways of automating the operation as an alternative to adding more personnel.

An IBM System 7 dedicated to the library function was considered. It was rejected on two counts — first, storage capacity was limited, so only part of the patron file could be placed on-line; secondly, the system could not support the printing of overdue notices.

The library staff also studied a stand-alone \$100,000 system from CLSI of Newtonville, Mass., but that system was deemed too expensive. In addition, it used a bar code instead of OCR-A, and the library management wanted OCR-A.

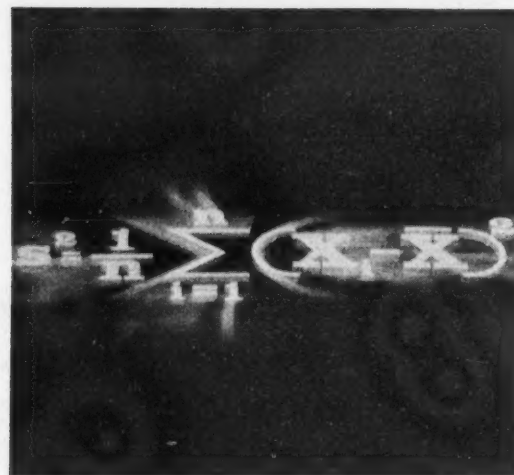
Management felt OCR-A offered two critical benefits: The code was human-readable, so staff could adapt to it easily; and Selectric typewriters could be used with special typing balls for easy replacement of worn book labels.

The township, already convinced of the viability of the hand-held wands, is planning to buy two more wands to use in its water billing and real estate tax billing operations. Bills will be printed in the OCR-A font, and wands will be used to

read them when they are returned with payments.

FORTRAN ABLE

The language of optimized performance



Interdata's FORTRAN VI optimizes object code to reduce execution steps and dramatically increase overall system throughput. It's a superset of ANSI standard (X3.9-1966) and takes full advantage of the IBM-like architecture of Interdata's 32-bit processors.

Superb data manipulation includes halfword for process control. Fullword for high precision and double precision for volume number crunching.

Its comprehensive reentrant library has run-time subprograms with mathematical functions, language extensions, real-time facilities and input/output.

All these FORTRAN-abilities make Interdata's FORTRAN VI the ideal language system to simplify sophisticated computation.

And, it's field-proven. Write or call today for documentation... or immediate delivery.

INTERDATA®
A UNIT OF
PERKIN-ELMER DATA SYSTEMS
OCEANPORT, N.J. 07757 (201) 229-4040.

In Personnel Productivity

Minis at Ford Lab Increase Accuracy, Save Money

DEARBORN, Mich. — Minicomputers at the Ford Motor Co.'s Central Laboratory Services here are producing increased accuracy while saving money in personnel productivity and clerical staff reduction, according to Frank Kunz, supervisor of the development group for graphic and laboratory services.

The lab processes between 50 and 70 requests for service each day, ranging from materials certification to the development of special methods and procedures. The staff and resources of each department must be allocated to the specific jobs at hand.

Ford decided to go with automated systems to increase efficiency, Kunz said. Prior to using minis, all the lab work was done manually.

The present system was built from the top down in order to ensure it could be used efficiently to generate reports as well as laboratory functions.

These functions include instrument automation; time-sharing for analytical data reduction; job control and tracking; customer billing for work done and laboratory budget control; and routine purchasing of testing supplies.

After the decision was made the lab considered systems from Digital Equipment Corp., Data General Corp. and Hewlett-Packard Co., according to Kunz.

The DEC system was chosen partly because of Kunz's familiarity with it from a prior project and partly because of its modularity and price, he said.

A host/satellite configuration couples a DEC PDP-11/40 with analytical instruments that have their own imbedded or adjacent minicomputers and/or microprocessors, Kunz stated.

Three RK05 disk cartridges allow random access storage of 3.6 million bytes, he noted.

The host computer has 28K words of main memory, expandable to 128K words, and can support up to eight magnetic disk cartridges. It operates under RSTS-11 and can support up to 16 interactive terminals. Applications programming is done in Basic.

Data processing is shared, for example, by a satellite PDP-11/10 serving an electron microprobe and the host computer, Kunz said. Automating most analytical scientific instruments requires mass data storage devices.

The host computer can provide that storage capacity, peripheral support and large-scale data reduction more cost-effectively than a decentralized system in which all the necessary computer power for performing automated functions is available in each specific instrument, he explained.

The satellite computers provide instrument control, data collection and limited data reduction and reporting on a stand-alone basis. Should any discrete computer in the system be out of service, the total system would still be operative, Kunz stated.

Over \$100,000 Saved

Between May 1974 and May 1975, the first year of operation, the integrated system saved over \$100,000 by increasing personnel productivity, Kunz noted.

Calibration curves for the X-ray fluorescence spectrometer, for example, take 24 hours to calculate manually. An imbedded microprocessor, the host PDP-11/40 and special application programs allow the same calculations to be

completed within one hour, he said.

Central Laboratory Services has developed a statistics program which reduces calculation time from two hours to five minutes, he added.

Faster turnaround has allowed analysts to be more thorough, he pointed out. The time saved can be used to repeat tests or to perform variations on them.

Further, the laboratory system has meant that Central Laboratory Services can accept larger and more complex materials analysis assignments.

Results are available three weeks earlier than they would have been without the system with a representative savings of over \$1,300 on one project alone, he added.

Greatest Cost Savings

The greatest cost savings have come as a result of clerical staff reduction in the sam-

ple receiving section, with 2.5 clerks transferred to other duties at a yearly savings of \$70,000, Kunz reported.

A job control and tracking subsystem allows clerks operating DEC VTO5 CRTs to enter all information relevant to a specific job directly into the host computer. The subsystem can accommodate 7,000 records in the job master file, he said.

A Status program provides for daily master file updating and interactive Search and Lookup programs allow on-line queries to any job record in the master file.

Daily management information system reports of various kinds are made possible by five subsystems — job control and tracking, billing, central stock, purchase order and budget. These now take one hour a month of clerical time to produce as compared with five clerical days-per-month prior to installation, Kunz said.

Desktop Unit 10 Times Faster

FORT LEE, N.J. — Micro Computer Machines, Inc.'s MCM/800 system is a desktop APL computer said to be 10 times faster than its MCM/700 predecessor.

The system operates in stand-alone mode using virtual memory techniques, according to a spokesman. The expanded operating system can reside on floppy disk or on optionally available diskette.

A redesigned power fail-safe protection system uses internal batteries to allow the system to continue to operate during transient power failure or shut down "in an orderly fashion" in the event of an extended outage, the

spokesman explained.

The unit can operate with the firm's MCP-132 printer plotter which runs at from 30 char./sec to 45 char./sec with a 15-in. wide print line, he added.

Either single- or dual-diskette units can be attached to the system with a capacity of 256K byte/diskette and a 260 msec average access time. Card reader and CRT can also be used with the unit, the firm added.

A basic 4K MCM/800 with 32-character plasma display and standard APL keyboard with auxiliary numeric keypad costs \$8,000. With 16K of memory it costs \$10,000 from 2125 Center Ave., Fort Lee, N.J. 07024.

Another good reason for taking part in the 1977 Computer Caravan:
You can show and sell a complete selection of all you have to offer.

When you're selling at the Computer Caravan, your booth is a complete showroom/sales office where you can give new prospects working demonstrations of a complete selection of your products. Unlike a routine sales call, you're not limited to a single-product presentation.

You can also use your Caravan exhibit to increase awareness of improvements and additions to your total product line among your current customer base. Your booth is an excellent way to show your current users how they can grow with their present system—and your organization.

For complete information on how the Caravan can work for you, write us. Just use the coupon, or call Roy Einreinhofer at (617) 965-5800.

NINE COMPUTER SHOPPING CENTERS THAT BRING THE BUYERS TO YOU
March 29 - June 9, 1977 • San Francisco • Los Angeles
Cleveland • Minneapolis/St. Paul • Chicago • New York
Philadelphia • Washington, D.C. • Boston



To: Roy J. Einreinhofer
Vice President, Marketing
The Computer Caravan
797 Washington Street
Newton, MA 02160

☐ Please send me more information on exhibiting in the 1977 Computer Caravan.

Name _____
Title _____
Company _____
Address _____
City _____ Zip _____
State _____
Phone (____) _____

**COMPUTER
CARAVAN
77**

Sponsored by COMPUTERWORLD

CI Notes

Memorex Gains Two Firms

SANTA CLARA — Memorex Corp. has agreed in principle to acquire Business Systems Technology, Inc. (BST), supplier of peripherals for small systems, especially the IBM 3.

The transaction is intended to be a tax-free exchange. Memorex proposes to exchange about 346,000 shares of stock for some 501,500 BST shares, a transaction valued at about \$8 million.

The acquisition is subject to a definitive agreement and approval of both companies' boards and BST's shareholders.

Memorex has also agreed to acquire Lencor International for \$2.4 million in cash and 200,000 shares of common stock.

Lencor is the sole owner and shareholder of CFI Memories, Inc., which manufactures tapes, disks and IBM 3 add-on memories.

EMM Managing CMI Base Of IBM 360/370 Memories

LOS ANGELES — Electronic Memories and Magnetics Corp. (EMM) has taken over management of the 360/370 memory lease base formerly owned by Cambridge Memories, Inc. (CMI).

The CMI lease base had previously been acquired by three banks headed by the First National Bank of Boston. Both EMM and the banks have transferred their lease bases to a separate company and, under a new management agreement, the combined lease bases are now being managed by EMM.

As a result of the transaction, this combination of add-on memory lease bases is second only in size to that of IBM, according to EMM.

Adds Granted Injunction Barring Milgo Stock Sale

NEW YORK — Applied Digital Data Systems, Inc. (Addis) has been granted a preliminary injunction barring Milgo Electronic Corp. from selling 312,000 Milgo shares to Racal Electronics Ltd. until April 15.

Federal Judge Edward Weingeld ruled that Addis had raised issues and established a potential hardship that were substantial enough to warrant the injunction, pending a trial.

Memos at Calcomp Trial Show

IBM Lease Plan Halved PCM Market

By Molly Upton
Of the CW Staff

LOS ANGELES — IBM's Fixed Term Plan (FTP) cut in half the plug-compatible manufacturers' (PCM) shipments and order rates within three months of its 1971 announcement, according to IBM memos exhibited here in the California Computer Products, Inc. (Calcomp) vs. IBM antitrust trial.

The documents show that although IBM expected an initial loss of revenue from the plan, the net effect of the forthcoming FTP and a price hike on 360 and 370 CPUs would be "a wash."

Thus IBM used its strength in the system area to assist in its retaliation against the PCMs, according to Calcomp attorney Max Blecher.

The documents, many of them unearthed

by Calcomp and shown in court for the first time, detail the effects of the FTP and other previous attempts by IBM to defend its base of tape and disk drives from the increasing incursion by PCMs.

Among the previous attempts were the 2319A and B disk systems for 370s and 360s respectively.

These not only represented a price cut on each spindle since they were repackaged 2314s, but also marked the inauguration of IBM's scheme to integrate controllers into CPUs, according to the deposition of Joseph G. Fitzgibbons, formerly president of Memorex Corp.'s sales and service organization.

Plan Altered Base's Pricing

IBM top management was distressed by the delay of other levels of IBM manage-

ment in either dealing effectively with the erosion of its peripherals base or bringing the matter to its attention sooner, according to one memo.

Top management's solution, the FTP, did the very thing all other IBM planning efforts had thought could not be done: It altered the pricing of the installed base, the memo said.

The FTP, announced May 27, 1971, consisted of 8% and 16% reductions from IBM's monthly rental charges if the customer signed leases for one or two years respectively.

It also abolished extra shift charges which, the documents show, IBM recognized to be a significant portion of the price differential between it and the PCMs.

The impact was almost immediate. Between January and May of 1971, the PCMs shipped a monthly average of 941 Model 2314-type devices. From June to August, however, this figure dropped to 506/mo, according to IBM's estimates.

The picture was nearly identical for orders booked — about 900/mo before FTP and 495/mo afterward, the IBM memos estimated.

In October, IBM said PCM tape shipments were reduced 62% and disks 48% from the previous levels.

The number of units being signed up under the FTP exceeded IBM's projections. IBM expected 40% of its installed disk, tape and printer base would sign up by the end of 1971.

But as of Aug. 1, 55% of all eligible units had been converted to the FTP. The split was even between one- and two-year signers, according to a memo from Gene Justice of corporate marketing to Warren C. Hume, a vice-president.

Accounts Wooed Back

Furthermore, IBM was starting to win
(Continued on Page 44)

CCIA Asks Dataspeed Tariff Stay, Charges FCC Violated Own Rules

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. — The Computer & Communications Industry Association (CCIA) has filed a motion asking the FCC to reconsider and stay its order permitting the interstate tariffing of AT&T's Dataspeed 40/4 pending the outcome of the commission's Computer Inquiry II [CW, Jan. 10].

The CCIA motion asserted there is a strong likelihood of success in reversing the decision to grant the tariff because the FCC violated its own rules, formulated in Computer I Inquiry, by allowing AT&T to offer the Dataspeed 40/4.

The commission had admitted in its order that the terminal is a data processing device, the association pointed out.

Even if one were to assume the Dataspeed does perform some message switching, the fact that it also performs data processing requires the FCC, again by its own rules, to determine whether the offering is a "hybrid communications service" or a "hybrid communications processing service," the CCIA argued. The commission has failed to do this, the motion noted.

The motion further charged the FCC "misread its own findings of fact" in Computer Inquiry I because the order stated the original Inquiry did "not address the dis-

tribution of data processing among devices other than the central computer."

In addition, FCC Chairman Richard E. Wiley's concurrence with the order stated the first Computer Inquiry "did not purport to prescribe rules and definitions for terminals," the motion said.

The CIA alleged such a reading was "clearly in error," arguing that one of the FCC's Computer Inquiry I rules deals exclusively with "remote data processing services," i.e., terminals.

The commission ruled arbitrarily by making its order contingent upon the outcome of Docket No. 20828 (Computer Inquiry II), already in progress, the CCIA charged, stating the "commission has engaged in
(Continued on Page 44)

Spin-Off Spins Off

TULSA, Okla. — Another of the spin-off lawsuits from the Telex vs. IBM trial is nearing completion.

In further developments in Walker vs. Telex and IBM, Telex's former attorney Floyd Walker has dismissed IBM from the action.

Walker had filed for payment of \$7.5 million he claimed Telex owed him for

services rendered under his employment contract [CW, Oct. 11].

IBM had, however, filed suit against Telex in order to recover court costs it has already incurred.

IBM's suit has been settled, with Telex paying the firm \$185,000, according to an IBM spokesman.

It's only logical that the leading IBM computer dealer can give you the best lease terms on a new 370/138 or 148

We are now offering 5 year operating leases on new 370/148 Processors at attractive rates with flexible lease terms. Our order position or yours.

When you re-think about it, getting a 370/138 or 370/148 makes a lot of sense. Doing business with Comdisco is the logical choice.

Write today or call your nearest Comdisco office.

Re-THINK

COMDISCO
THE LOGICAL CHOICE

9701 W. Higgins Rd. Rosemont, Ill. 60018 (312) 698-3000



Here's why Digital's PDP-11/70 is the fastest selling supermini in the world.

In the short time that the PDP-11/70 has been offered, Digital has shipped over 1,000 of them. Customer applications include everything from laboratory research and education to extensive communications and commercial transaction processing.

What makes the 11/70 so popular? There are almost as many reasons as there are users. In conversations with a wide range of customers, four major reasons are repeated time and again: throughput, reliability, software and Digital itself.

"We went to PDP-11s initially because no other systems offered the price/performance. User response was so enthusiastic that we added more terminals and expanded to the 11/70. Our users love it. Reliability has been exceptional."... D.H. Casagrande, Manager, Corporate Systems, ATCO Industries, Ltd.

The 11/70 is a very powerful computer, designed throughout to handle more data far faster than machines costing 5 times as much. It's supported by an outstanding selection of software. And since it's made by Digital, you can expect the highest quality, reliability and support services.

"We have a highly challenging mix of computing requirements. The 11/70 has come through with flying colors."... Loren Gilmore, Corporate Manager of Engineering and Process Control Systems, International Harvester Company.

If you're wrestling with a mixed bag of computer needs, the PDP-11/70's your machine. It has an impressive variety of operating systems, languages, data management facilities and applications packages. It can handle real-time, timesharing and batch in any combination at the same time.

"We chose the 11/70 because it had all the tools we needed for a heavy transaction processing workload. And it's lived up to all our expectations."... R.E. Umbach, Manager, Intercom Systems, Walgreens.

More and more organizations need a system that provides fast turnaround of up-to-the-second information to dozens of users simultaneously. The 11/70 gives it to them: the operating systems, the database tools, the communications and the raw operating speeds themselves.

"The 11/70's power was impressive, but it was primarily the software that sold us."... Mel Culp, Systems Services Manager, Allis Chalmers Power Systems, Incorporated.

The PDP-11/70 comes with a choice of three major operating systems — IAS, RSTS/E and RSX-11 — that fit just about any operating requirements. Several languages, like COBOL, FORTRAN, BASIC, APL, DIBOL and RPG-II. And various data management systems, including multi-key ISAM and the only CODASYL-compatible Data Base Management System available in its class.

"There were only two companies that had the communications capabilities we wanted. On all counts the 11/70 was superior."... Royle Vagle, Director of Data Processing, Cooperating School Districts of the St. Louis Suburban Area, Inc.

Digital is ahead of everyone in the area of data communication capabilities. There's the DECnet software that lets you communicate with a broad range of Digital computers, from micros to maxis, and a wide range of interfaces, terminals and services.

"Reliability was a critical requirement, and we got it. We've had only one machine failure in six months."... Charles Holmes, Manager of Computer Services, Farinon Electronics.

Up-time, in fact, was one of the major goals in the 11/70's design. It started with the selection of the most reliable components tested under worst-case conditions. And culminated in a system where operations are continuously monitored by hardware or software. If you do have a problem, the 11/70 diagnostics and packaging make it one of the most quickly serviceable computers on the market.

"Digital had the system, the software, and the support. Their commitment has been solid from the outset."... Gary Bernstein, Manager, Computing Systems, Biomedical Engineering Unit, McGill University.

To support all our hardware and software, we've created one of the world's largest support organizations. 5,000 people in 300 locations worldwide provide the very best software, educational, and service support.

"It was an easy decision. Both Digital and the 11/70 had an excellent track record. And they've both lived up to it."... Raymond Neff, Director, Health Sciences Computing Facility, Harvard University School of Public Health.

For more information on Digital's PDP-11/70 call your local Digital representative. Or send the accompanying coupon.

Digital Equipment Corporation, Maynard, MA 01754. European headquarters: 81 route de l'Aire, 1211 Geneva 26. In Canada: Digital Equipment of Canada, Ltd.

digital

Digital Equipment Corporation, 146 Main Street, Maynard, Mass. 01754. Attention: Communication Services NR-2/2.

I'm very interested in your PDP-11/70 system. Please send me your new brochure.

Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____

CW1247

Information Processing Drops on Forbes Industry List

NEW YORK — The median return on equity in the information-processing industry dropped the sector from seventh to 16th place in *Forbes Magazine's* annual ranking of industries.

Information processing, which includes copiers and office equipment as well as computers, had an average return on equity over five years of 12.6%.

The median return on equity for the 30 industries in the last 12 months was 12.9%. Computers were slightly under with 12.7%, while copiers and office equip-

ment, with its 8.1% figure, dragged down the information-processing industry's average.

The industry's five-year average on return on working capital — 9.6% — ranked 13th.

Forbes said the median figures for the information-processing industry are less significant than for others since it is dominated by IBM and Xerox. "Both IBM and Xerox are doing fine, thank you, but their competitors are not doing nearly as well."

Sales for the information-processing industry grew an

average of 13% over the past five years, earning a seventh place ranking.

DP Earnings Grow

The computer portion of the industry saw its per-share earnings grow an average of 11.7% in five years.

Looking more closely at the participants in the field, *Forbes* found several firms ranked the same in return on equity and in return on total capital for the five years.

IBM was first, followed by Hewlett-Packard Corp. (HP),

Digital Equipment Corp., Burroughs Corp., Sperry Rand Corp., Honeywell, NCR, Control Data Corp. and Memorex.

But DEC led in both sales growth for five years and in earnings per share. Memorex was second in sales, followed by HP, Burroughs, IBM, CDC, Sperry Rand, Honeywell and NCR.

In earnings per share, second place went to Hewlett-Packard, then Burroughs, IBM, Sperry Rand, NCR, Honeywell, CDC and Memorex.

The range in return on equity

spread from 20.1% to a deficit, while the growth in sales ranged from 36.5% to 9.5%.

Earnings per Share

In earnings per share, DEC and HP outdistanced the rest of the pack by a fair amount; DEC led with 29.1% and HP followed with 23.3%. The next entrant was Burroughs with 17%, according to *Forbes*.

Compared with other firms in the other industries, however, IBM ranked only 113th in terms of return on equity for the five-year average and 44th in return on capital.

HP, which was second on the DP list, ranked 165th in return on equity and 63rd in return on capital. Texas Instruments was 234th in return on equity.

DEC ranked 311th in return on equity but 115th in return on capital and Burroughs 370th in return on equity.

DEC's rapid growth earned it a ranking of 62nd in earnings per share and 23rd in sales, according to *Forbes*.

Amdahl Enters Micro-Bit Effort

LEXINGTON, Mass. — Amdahl Corp. has taken a minority equity position in Micro-Bit Corp., a privately held company engaged in the development of high-performance computer memory devices.

Amdahl, which invested \$500,000 during 1976, has a commitment to invest \$1 million during 1977. It also has an option to invest an additional \$3.5 million before Dec. 31, 1980.

In addition to stock in Micro-Bit, Amdahl will be granted licenses to manufacture and market certain of its products.

Others holding equity positions in Micro-Bit include Control Data Corp., Exxon Enterprises, Commercial Credit Capital Corp. and Sprague Electric Co.

Basic/Four Making CRTs for Its Systems

IRVINE, Calif. — Basic/Four Corp. has begun manufacturing a CRT terminal for its small business computers.

The move will "allow the company to achieve a lower cost and improved reliability," according to T.J. Smith, president.

Designated the Model 7230, the CRT is being manufactured under a licensing agreement with Lear-Siegler, who supplied earlier versions of the terminal.

Key Tronic Sues

SPOKANE, Wash. — Key Tronic Corp. has filed a countersuit against Controls Development Corp. and its parent company, Automix Keyboards, Inc., over patent infringement on a capacitive switch.

In response to an initial patent infringement charge by Controls Development, Key Tronic is requesting a declarative judgment that Key Tronic is not infringing on any such patent and that Controls Development's patent claim is not enforceable or valid against Key Tronic.

Syncom Premium Certified Tape. We have to be better!



The QUIET cat in a field of tigers!

Syncom's Premium Certified computer tape is more than just 100% certified on all tracks. It's 100% certified for surface uniformity from end to end and consistent high output for each and every reel. True, it has high hardness of surface, but more importantly, a low abrasive factor for head wear.

These are the factors that make it purr — again and again. You can save quite a "kitty" when you buy Syncom's Premium Certified tape.



SYNCOM
INCORPORATED

ONE SYNCOM PLACE
ORCHARD PARK, N.Y. 14127
TEL. 716-662-2181
TWX 710-264-1953

Computer Tape ■ Flexi-Discs ■ Disk Packs ■ Ribbons ■ Digital Cassettes ■ MC/ST & MT/ST ■ Xerox & IBM Copier Toners

DISTRICT
OFFICES:

ATLANTA
404-325-8767

DALLAS
214-241-8546

LOS ANGELES
213-332-2193

SAN FRANCISCO
415-676-1756

TORONTO, CANADA
416-447-0301

Sign up now for the Computer User event of the year!

Case Studies in Data Processing

the special Computer User Forums held in 9 cities—in conjunction with

COMPUTER EXPO 77



Register now to participate in a city near you — and also attend free the largest multi-city computer show of the year!

Each of the Computer User Forums will be conducted by a leading user or independent consultant who will lead seminars and workshops on these relevant, up-to-date topics.

Tuesday: Case Studies in Applying Minicomputers — the Mini as Mainframe; Distributed Minis with Communications; Organizational Impact of a Distributed Mini System.

Wednesday: Case Studies in Managing Terminal Networks — "Dumb" Terminal Networks; "Intelligent" Terminal Networks; Remote Batch Systems; Communications Aspects of a Network's Use of Minis.

Thursday: Case Studies in Improving Software Productivity — Personnel Recruiting, Selection and Training; Software Alternatives; Measuring Systems Utilization; Documentation and Maintenance Aids.

All Forums will take place from 9 AM to 1 PM.

Concurrently, hundreds of exhibitor products and services will be shown at Computer EXPO 77 each day from 10 AM to 5 PM. There is no admission charge to the exhibit hall.

See the latest and the best in:

Data Communications Terminals, Minicomputers, Software, Printers, Data Input Equipment, CRT Terminals, Computer Output Equipment, Data Communications Interconnect Equipment, Supplies, Magnetic Media, Modems, DP Education, Small Business Computer Systems, Mini-peripherals, Flexible Disk Drives, Magnetic Tape Transports, Cassette Systems, Microcomputers, Keyboards . . . and more!

HOW TO REGISTER FOR THE FORUMS

(No advance registration or admission charge is required of qualified executives for the Computer EXPO program — including exhibit hall and exhibitor seminars. Your business card will admit you.)

Send to:
Registration Office
Computer EXPO 77
797 Washington Street
Newton, MA 02160
(617) 965-5800

Register me for ☐ all three days
☐ Tuesday
☐ Wednesday
☐ Thursday

Name _____ Title _____
Company _____
Street and Number _____ City _____
State _____ Zip _____ Telephone () _____

Check city in which you plan to attend:
(your acknowledgement form will include complete details on times and locations)

- | | |
|---|--|
| <input type="checkbox"/> San Francisco | March 29–31, San Francisco Civic Auditorium |
| <input type="checkbox"/> Los Angeles | April 5–7, Los Angeles Convention Center |
| <input type="checkbox"/> Cleveland | April 19–21, Cleveland Convention Center |
| <input type="checkbox"/> Minneapolis/St. Paul | April 26–28, St. Paul Civic Center |
| <input type="checkbox"/> Chicago | May 3–5, McCormick Place |
| <input type="checkbox"/> New York | May 10–12, New York Coliseum |
| <input type="checkbox"/> Philadelphia | May 24–26, Philadelphia Convention Center |
| <input type="checkbox"/> Washington, DC | May 31–June 2, Sheraton Park Hotel |
| <input type="checkbox"/> Boston | June 7–9, Northeast Trade Center (Rte. 128, exit 39) |

(Registration for any single forum day entitles you to attend all three days of exhibits. If you wish to attend the exhibits only, no advance registration is required.)

☐ Check Enclosed ☐ Purchase Order Enclosed ☐ Charge my American Express

Cardholder Number

Expiration Date _____

Cardholder Signature _____

PAYMENT RECEIVED

☐ \$45.00 One Forum Day ☐ \$80.00 Two Forum Days ☐ \$115.00 Three Forum Days

Please Circle 1 Number in Each Category

BUSINESS/INDUSTRY

- 10 Manufacturer of Computer or DP Hardware/Peripherals
- 20 Manufacturer (other)
- 30 DP Service Bureau/Software/Planning/Consulting
- 40 Public Utility/Communication Systems/Transportation
- 50 Wholesale/Retail/Trade
- 60 Finance/Insurance/Real Estate
- 70 Mining/Construction/Petroleum/Refining
- 75 Business Service (except DP)
- 80 Education/Medicine/Law
- 85 Government — Federal/State/Local
- 90 Printing/Publishing/Other Communication Service
- 95 Other _____

TITLE/OCCUPATION/FUNCTION

- 11 President/Owner/Partner/General Manager
- 12 VP/Assistant VP
- 13 Treasurer/Controller/Finance Officer
- 21 Director/Manager of Operation/Planning/Administrative Service
- 22 Director/Manager/Supervisor DP
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
- 41 Application Engineer
- 42 Other Engineering
- 51 Mfg. Sales Representative
- 52 Other Sales/Marketing
- 60 Consultant
- 70 Lawyer/Accountant
- 80 Librarian/Educator/Student
- 90 Other _____

COMPUTER CARAVAN 77

A division of Computerworld, Inc.
797 Washington Street, Newton, MA 02160

Do it now.

V
1
1
Z

J
A
N
2
4

7
7
UMI



Just one of the many leading companies you'll see at

COMPUTER
EXPO 77

TEC will display its new terminal, the 1445, and floppy disk memory system, the Disco-TEC, which is a superior alternative to cassette storage devices. The 1445, which is teletypewriter compatible, offers upper and lower case, 1920 character display, cursor positioning and much more.

Organized by:

COMPUTER
CARAVAN
77

The national computer exposition that's coming to you.
797 Washington Street, Newton, MA 02160
(617) 965-5800.

San Francisco • Los Angeles • Cleveland • Minneapolis/St. Paul
Chicago • New York • Philadelphia • Washington, D.C. • Boston. Starts March 29th.

Memos Show FTP Hurt PCMs

(Continued from Page 39)

back accounts from the PCMs. Figures compiled by Ralph A. Pfeiffer, president of the Data Processing Division, showed IBM 3330s and 2319s had replaced at least 300 PCM 2314-type drives while orders for the 3420 tape drive would replace 270 PCM tape drives.

A memo written at the end of June indicated most PCMs had countered with their own price decreases but that the FTP had slowed them. Memorex, for instance, was reported to have cut back production about 30% and decided to expedite development of its 3330-type drive, an IBM memo stated.

Greater Impact Than 2319

Memorex's Fitzgibbons said the FTP had a more dramatic impact than the 2319s on the PCMs. The FTP "locked us out of the marketplace."

IBM's decision to adopt the FTP, which was expected to result in reduced revenues

for the first two years, was prompted by Chairman Thomas J. Watson Jr.'s April 1971 urging to "swallow the financial pills" and get the company ready for the future.

"We must return the company to a growth posture," he admonished.

Francis (Buck) Rodgers, vice-president of marketing, had written Watson a few days earlier saying that if the PCMs' replacement of 2314s continued at the March rate, PCMs would replace 37% of IBM's rental inventory by the end of the year.

The reasons for the popularity of the PCMs' products, IBM management repeatedly acknowledged, were equal or better performance at lower prices.

Although the FTP would cause a reduction in IBM revenues in 1971 and 1972, the firm predicted this would be more than made up by protecting the forthcoming 3330 disk from PCMs.

A study in May, prior to FTP, forecast reduced revenues in 1971 and 1972 of about \$13.2 million and \$20.3 million respectively, but a net increase between 1971 and 1975 of \$411 million, principally from the \$406.2 million IBM expected to realize from the 3330.

Reduced Profits Seen

But these reduced revenue projections disturbed Paul J. Rizzo, IBM chief financial officer, who on July 2 predicted the FTP would cut corporate profit by \$102 million and urged management to raise prices wherever possible.

In answer to Rizzo, the Management Review Committee decided on July 9 to hike prices as much as 8% on 370 CPUs and 4% on 360s. Because of price control red tape, these were not effective until December, IBM attorney David Boies remarked.

The combined effect of the FTP and the CPU price hikes would be "a wash insofar as business volumes are concerned," according to the calculations of F.A. Powell, who was in IBM's Corporate Planning Group.

Other Countermeasures

Other previous attempts to counter the PCMs included the 2319, described by J.D. Kuehler, head of IBM's San Jose Labs, as a "kluge." It was not a new machine, he stated in August 1970, but repackaged 2314s.

Memorex's Fitzgibbons described the 2319 as "disheartening." There was no clear way to react except to lower prices, he said.

Memorex lowered the price of its 2314-type controller to about \$600, which was very close to the break-even level, in order to keep its base installed, he said.

The firm was intent on making its business appear viable in order to prevent the financial community from losing faith in the company, he said.

The partial integration of the controller function and the accompanying difficulty of maintaining a mixed system made independents reluctant to market any portion of the 2319, Fitzgibbons said.

CCIA Asks FCC Stay Of Dataspeed Tariff

(Continued from Page 39)

what amounts to regulatory coin-flipping."

The order has the effect of preordaining the outcome of Computer Inquiry II in violation of its General Rules of Practice and Procedure, it continued.

The association's motion further contended the FCC's failure to render a stay of its order will cause irreparable injury to the CCIA's member companies because Computer Inquiry II may drag on for years.

During that time, AT&T will market the Dataspeed 40/4 and accrue revenues which will be unrecoverable by competitors if the Inquiry does in fact find the Dataspeed 40/4 an illegal offering, the CCIA claimed.

The motion contended the granting of a stay by the FCC will not irreparably injure AT&T.

What's the difference between their Data Module and ours?



About \$875 and a thirty-three month guarantee.

At a price of \$1,325 per pack, plus the satisfaction that comes with a thirty-six month guarantee, our model 70 3348 compatible Disc Packs add up to exceptional value. So if you are looking for Data Modules which meet or exceed all pertinent specifications, plus quality features like factory CE track initialization, guaranteed operation in 70 megabyte mode, 100% electronic certification to assure maximum recording capability, and guaranteed new and zero error at initialization, our 3348 compatible Disc Pack is a great way to save \$875. For a complete catalog on all our money saving products just complete the coupon. Or, for instant action today, call us toll free. (800) 348-0806 • (INDIANA RESIDENTS (800) 552-4789)

Please send me a FREE catalog detailing the model 70 3348 Data Module and your complete line of data processing equipment and supplies.

Name _____

Company _____

Title _____

Street _____

City _____ State _____ Zip _____

Phone: () _____

MAIL TO:

NATIONAL DATA PRODUCTS, INC.
11910 Bluffton Road, P.O. Box 9128
Fort Wayne, Indiana 46809



Document in Calcomp Case Shows

GE Considered Attempt to Compete With IBM Too Risky

Although Reginald H. Jones, chief executive officer of General Electric Co. (GE), testified in the U.S. vs. IBM trial that no act of IBM forced GE out of the computer business [CW, Dec. 17, 1975], GE's Ventures Task Force report shows IBM's size and market position were considerations in GE's decision to sell its computer mainframe business.

By Molly Upton
Of the CW Staff

LOS ANGELES — General Electric Co.'s Information Systems Group's plan to make GE competitive with IBM was too costly and too risky for the firm, GE's Ventures Task Force (VTF) report stated.

GE was not prepared to finance the \$500 million effort deemed necessary to make it a competitive vendor with a full range of products, according to the report, entered as evidence in the California Computer Products, Inc. (Calcomp) vs. IBM trial here.

The VTF thought the plan especially risky because gains in GE's market share were predicated principally on the assumption IBM would lose some ground to GE and not unveil a more sophisticated product that would impair GE's attempts to increase its base.

The report, prepared by Reginald H. Jones, then senior vice-president; R.M. Estes, general counsel; and J.B. McKitterick, vice-president of corporate planning, was delivered to the corporate executive office April 24, 1970 and was the basis for GE's decision to sell its DP equipment business.

The group was asked to recommend ways to make GE's newer ventures more consistent in earnings growth with the core of the company's business, related to energy equipment.

The losses from these ventures had nearly flattened GE's per share earnings growth, Jones said in the report.

Looking at the computer equipment area, the group found the gear was well along in its cycle and a major new investment would be needed.

But GE's information services weren't exempt from scrutiny. They were entailing higher losses than had been foreseen and would require additional investments, Jones observed in his report to management.

Problems With APL

The VTF looked at the Information Systems Group's plans for an Advanced ProductLine (APL) and concluded that "APL entails very high risks and . . . it is doubtful that it could be kept to time, cost and system performance schedules."

The APL plan, designed to put GE in the No. 2 slot behind IBM, represented a "full line" strategy calling for compatible computers and associated services "significantly (20% to 40%) superior to any available from IBM."

The APL plan also would have put GE "in direct confrontation with IBM," McKitterick observed.

"Even if General Electric were in a position to undertake such an ambitious program, we would not recommend that it invest the requested sums in such a hazardous project predicated on an all-out attack on IBM, one of the world's strongest corporations," Jones said.

"Faced with the lack of earnings growth, but seeking to retain its image as a growth company, GE cannot, in our opinion, undertake any half-billion-dollar venture, such as APL, that produces substantial immediate net income losses," he stated.

Jones later said the \$500 million or \$800 million required by the APL was "substantial in relation" to the firm's capital commitment in the business, which he estimated at \$200 million.

Because GE had a sprawling, hard-to-defend installed base that was "already obsolete and vulnerable, time is not on our

side," the report said.

But the answer for GE was not specialization, since GE with its diverse base "cannot fend off IBM with a specialized customer or mainframe approach because it would protect little, build on little," it continued.

Sizable Perils

The VTF was concerned that if GE brought out new equipment that "leapfrogged IBM, it would not be long before we were leapfrogged," Jones said in his testimony.

The report pointed out sizable risks:

- "Obviously, the risks of a major shortfall in realization of these market objectives are enormous."

- "In addition, we face the probability that our APL will be technically inferior to IBM's product offering."

- "We hope to offset the expected hardware deficiency by software innovations of unprecedented difficulty."

- "Given the massive buildup of marketing resources, any slippage in our systems development timetable could have disastrous financial consequence."

In comparing GE's costs and resources with those of IBM, VTF found GE's manufacturing costs were 47% of revenues while IBM's were an estimated 20%.

GE had 4% of the market, IBM 70%. GE's DP cash generation was \$3.6 billion while IBM's was \$2 billion.

But the APL plan's goal was to capture 7.1% of U.S. shipments by 1975 compared with 2.9% in 1969.

An implication of this goal was that APL would account for 10% of total shipments in its intended market and that IBM's total

share of shipments would fall from 70% to 59% with GE capturing the largest share of IBM's loss, McKitterick observed.

GE should hold onto its information services business, the report recommended, for four reasons:

- "Projected losses not unduly burdensome."

- "Many potential buyers, as contrasted to equipment business."

- "Capitalizes on GE strengths in data communications."

- "GE has important presence and image in information business in fastest growing segment where we currently are the leader."

While the equipment business was expected to double in the next five years, a tenfold growth was forecast for the information services arena.

BEFORE YOU BUY OR LEASE AN ADD-ON MEMORY, FIND OUT WHO STANDS BEHIND IT.

When you buy or lease an add-on memory, you're also buying or leasing the company that delivers and installs it, services it, updates it, and stands behind it if the darn thing breaks down.

If you don't look past price and specifications in making your selection, you're looking for trouble. With that in mind, we want to tell you about the company that stands behind EMM add-on memories. It should make an attractive product look even better.

We are now the top independent add-on memory house in the world. And we're undergoing a major expansion of staff and facilities to make us even more responsive to the needs of the market.

As a vertically integrated company, we control every step in the manufacturing of our memories, from chips and subassemblies through the finished product. This enables us to keep a tight control on quality and reliability. It also prevents us from passing the buck.

We have the largest selection of memories anywhere: from core you thought you'd never see again through semiconductor memory for this week's variation on the 370.

Behind every EMM add-on memory stands a financially sound company, firmly committed to the add-on memory business. We'll be there with the products and services you need. Today. Tomorrow. 1986.

Maybe that's why EMM has the highest percentage of repeat business of any add-on memory supplier.

We stand behind our product.

EMM

SYSTEMS EQUIPMENT DIVISION

Electronic Memories & Magnetics Corporation

3216 West El Segundo Boulevard, Hawthorne, CA 90250

WE'RE COMMITTED TO MEMORY.

For more information, call your regional EMM sales office. Eastern (201) 845-0450. Central (312) 297-3110. Western (213) 477-3911. Europe: Bad Homburg, West Germany 06172/6094.

Sycor Sued Over Prospectus

ANN ARBOR, Mich. — Sycor, Inc. has been served with a class action suit by a stockholder charging that its prospectus contained untrue statements or omissions of material facts regarding Sycor's foreign operations.

The suit was filed in the southern district of New York by Munsey Trust on behalf of purchasers of Sycor common stock between March 23 and Nov. 1, 1976. No specific amount of damages was cited in the suit.

A Sycor spokesman said the firm believes the suit is without merit.

During the week of September 20, Sycor dropped 6.5 points after the company revised downward its projections for the year as a reflection of an expected decrease in the level of foreign revenues.

Sycor said fall shipping schedules to its large OEM customer, Olivetti, were uncertain because of a disruption of sales in South America and year-end inventory planning.

Calcomp Eyes Stronger Floppy Position

By a CW Staff Writer
ANAHEIM, Calif. — Hank Meyer, director of small disk operations at California Computer Products, Inc. (Calcomp), has some schemes up his sleeve to improve Calcomp's position in the floppy disk marketplace.

Armed with a separate operating organization within Calcomp and its own profit-and-loss statement, Meyer intends to utilize the advantages of a big company along with newly gained responsiveness from a smaller organization.

Calcomp's service organization is being tuned to support floppies, he said. "This is an investment on

our part which we hope will show our intent to be in this business in the long run," he explained.

Current industry practice is to return drives to the factory for repair. However, the Calcomp organization should provide either repairs or replacements from its local service arms, he said.

"The next round of competition will be in the service area," Meyer said, adding the increasing numbers of end users are going to expect high levels of service.

Small Company Response

In line with the competitive nature of the floppy disk business, the Calcomp reorganization was designed to enable the small disk unit to provide rapid turnaround and responsiveness — to function as a small company, Meyer explained.

The small disk unit has its own engineering, manufacturing, marketing and quality control sections.

Meyer characterized the reorganization as challenging and said he feels confident Calcomp can grow a business out of the floppy disk area.

In the long haul, prices, currently from erosion, will be more reasonable, he said.

Meyer plans to have a double-sided drive soon, perhaps by the second quarter, and is also moving into the systems business in the memory and graphics areas.

Currently, Calcomp does not make a host adapter, but does in-

tend to make one for use in its systems, he said.

Meyer expressed concern about continued price erosion within this industry which, he said, is coming from firms with smaller bases as well as Shugart. Wangco is "aggressive" and Pertec is "determined," he said.

In OEM quantities of thousands of drives per year, a drive is priced under \$350, he said. "Even at those volumes the price should be over \$400 if the industry were mature" and companies were able to pay cost-of-living increases and perform R&D, he said.

Citing the immaturity of the industry, Meyer said customers don't seem aware that low prices may imperil suppliers. Buyers are getting second sources both as a means of procuring lower prices and also as a backup.

Meyer is concerned that other floppy vendors may be basing prices on the premise that they can optimize costs through volume. But volume production has a cost associated with it, he said, and requires a level of responsiveness that is of a different dimension from that associated with producing large disks.

The floppy disk industry will mature when other mainframes come in, he said, explaining they traditionally have demanded higher margins.

"I'd hate to see the industry go the route of the calculator," he remarked.

When there is little value in the drive, then the next trend is to move into the systems area, he said.

Calcomp will continue to sell to OEMs but recognizes that such sales are "not the lifeblood but rather a means of keeping production at a stable level. It also provides economies of scale," he said.

Service Matches DP Buyers, Vendors

ARLINGTON, Va. — A computerized marketplace for buyers and sellers of all types of electrical and electronic products has been formed by Industrial Marketing Advisory Services (Imas) here.

The clearinghouse for bids and quotes provides the buyer with the opportunity to shop the country for CPUs, peripherals, memories or any other type of computer-related equipment, according to Steven Dana, president.

One phone call sets the Imas machine in motion at no cost or

obligation to the buyer, he said.

A buyer begins the cycle by calling a toll-free number with his purchasing requirements. An interactive answering system records his name, company and details of the order.

This information is then transcribed so it can be categorized, matched and sent out to Imas subscribers in the form of sales leads on a weekly basis.

Leads are currently segmented into product categories as well as regional categories, Dana noted.

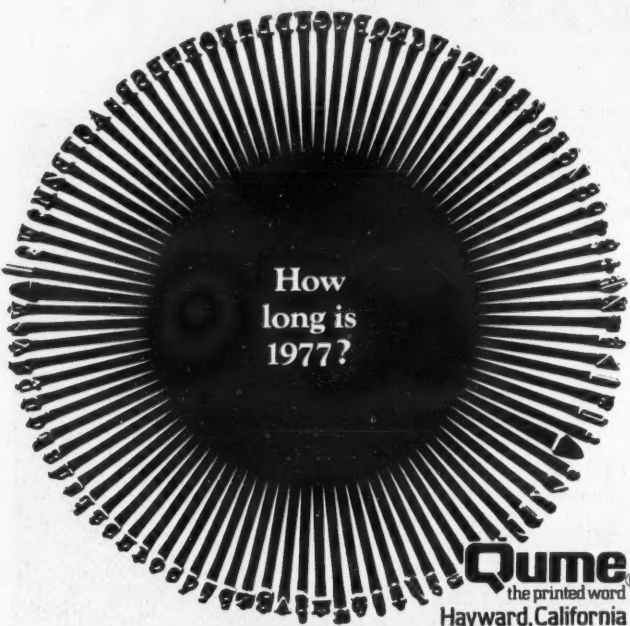
"Imas does not intervene in the selling process, but saves the buyer time and effort by searching all over the country for sources of supply," Dana said. "Subscribers then contact buyers directly."

"Most importantly, Imas increases the buyer's options and allows him to purchase according to his priorities: faster delivery, better price, etc.," he said.

The cost of the service is borne by the subscribers. A trial subscription of 50 sales leads is \$75, Dana said.

Renewal is on a sliding basis with three options: 100 leads at \$2 each, 250 leads at \$1.75 each or 450 leads at \$1.50 each.

Imas is at 2425 Wilson Blvd., Arlington, Va. 22201.



Contracts

Harris Corp. has been awarded a contract from Western Union valued at nearly \$80 million over a three-year period for equipment to be used in a satellite communications system which Western Union will provide for the National Aeronautics and Space Administration (Nasa). Western Union received a \$796 million contract from Nasa to furnish space communications from the new system over a 10-year period.

Aeronutronic Ford Corp.'s Space Information Systems Operation has been awarded a \$400,000 con-

tract by Lykes Brothers Steamship Co. for software development, implementation and evaluation of an equipment control system.

Microform Data Systems' Telephone Division has received a \$408,000 contract from Telefonos de Mexico S.A. to install an on-line automated directory assistance system in Mexico City.

Kennedy Co. has been awarded a \$1 million contract from Systems Engineering Laboratories, Inc. for Kennedy's Model 9300 magnetic tape transports and Series 9000 transports.

VOLUME KEY PUNCHING
(402) 592-1686

"QUALITY AT LOWER COST"

AMERICANA KEY PUNCH
4345 South 89th St.
Omaha, Nebraska 68127

Success Story!



60-Day Trial Review

You can use and evaluate Datapro 70 in your office for 60 days, with no purchase obligation. Act now. To get details about Datapro's Trial Subscription plan, simply return the coupon with no obligation.

1970: Instant acceptance! Datapro 70 filled the need for objective, up-to-date reports, ratings and news about fast-emerging (and sometimes fast-disappearing) data processing products. "The EDP Buyers' Bible" was born. And EDP pros everywhere started turning to Datapro to save money and improve productivity.

TODAY: Datapro 70 is the world's most widely used EDP information service, helping an estimated 100,000 EDP professionals at more than 10,000 subscriber facilities... delivering coverage of the DP scene that is more timely, comprehensive and complete than ever—ranging from microprocessors to major mainframes.

If you're still working without the advantage of Datapro information, here's your chance to try it the easy, more cost-effective way.

Mainframes • Midis • Minis • Peripherals • Software • Terminals • Data Communications
Media & Supplies • Users' Ratings • Feature Reports • Case Histories • Suppliers

☐ Yes, I would like to learn how I can review Datapro 70 under Datapro's 60-day Trial Subscription plan.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

For those who value information.
datapro

DATAPRO RESEARCH CORPORATION
1805 Underwood Blvd., Delran, NJ 08075
609-764-0100

CWGGGG

Alternative to Bell

Prentice Expanding in Low-Speed Mart

By John P. Hebert
Of the CW Staff

PALO ALTO, Calif. — Prentice Corp. is expanding its place in the low-speed end of the data communications marketplace by offering alternatives to Bell Telephone's equipment, according to Peter Cregut, president.

Prentice has been offering the user "a multitude of ways to solve communications problems, with streamlined equipment and money-saving methods," Cregut said in a recent interview here.

The approach is helping the company to pull away from its collision with bankruptcy in January 1974 — a fact which is not well known, Cregut said.

There was no change in the continuity of business at Prentice between that time and October 1975, when the company obtained new financing to get out of the Chapter 11 proceedings, he noted.

Prentice is presently operating at a revenue level of \$2 million, which should reflect \$500,000 on the bottom line in April at the close of its 1977 fiscal year, Cregut said.

This past April, the 100% end-user-oriented firm had revenues of about \$1 million and profits of about \$200,000, he added.

In the future, however, Cregut predicted Prentice will reap benefits from an expansion in the low-speed communications area which, he said, should triple between now and 1985 for independent communications equipment manufacturers.

This expansion results from an absence of changes in the efficiency of that area in the past added business from small- and medium-sized users asking for low-speed communications capabilities in the future, he explained.

Prentice's future, Cregut said, will be determined by its ability to grow within a marketplace where prices are largely stabilized by IBM and Bell.

The privately held company's major growth areas include 1,200 bit/sec interactive communications, the line driver business and short-haul communications.

Bell's recently announced Single Message Rate Tariff (SMRT) will change the present method of dial-up interactive communications because users will be forced to utilize leased lines as a result of higher, time-dependent costs, Cregut said.

A user could, in the past, dial the CPU site and leave the line up all day, but now that would be too

expensive, he added.

Bell's changes have benefited the low-speed end of the business and squeezed the high end at the same time by stimulating more competition, he said.

As a result, Prentice's most rapid growth will be experienced in short-haul, low-speed communications applications served by Bell- and IBM-compatible modems and frequency division multiplexers (FDM), limited range adapters and asynchronous and synchronous line drivers, he stated.

All these products evenly split the bulk of the company's business, he added.

Cregut noted the FDM opportunity is greater than is generally conceded because the FDM is not limited by the number of terminals on a communications line to determine the communication speed.

Prentice has been helping the computer end of large companies and organizations concentrate equipment in one place and let the phone companies play with handling the concentrated data communications from that equipment, Cregut said.

The purpose of this is to save the user money and time, Cregut added.

OEM, End-User Balance Aim Of HIS Level 6 Upgrades

By Esther Surden
Of the CW Staff

BILLERICA, Mass. — Honeywell Information Systems, Inc. (HIS) will continue to direct its Level 6 enhancements "in a balanced fashion toward OEM, system-builder and end-user market segments," according to David E. Booth, director of minicomputer marketing and programs.

Speaking at the introduction of the 6/43 recently, Booth said HIS believes that maintaining the balance between the volume-oriented OEM and end users oriented toward support services will keep the Level 6 price competitive.

The announced agreements with customers such as Industrial Nucleonics, Inc. in the automated controls area, Base Information Systems, Inc. (a subsidiary of Advanced Computer Techniques Corp.) in the word-processing area and a variety of organizations developing data communications, medical applications and other systems represent the OEM side of the scale.

A parts distributor, developing an inventory management network, and Citibank, developing a word-processing network, represent end users that have made a commitment to the systems.

In the display arena, HIS is looking for an average annual growth rate in the worldwide display terminal market ranging between 25% and 30% over the next five years, Pompa added.

Minicomputer revenues increased more than 25% over 1975's total at HIS, according to Lee E. Sheehan, vice-president and general manager of the U.S. Information Systems Group.

"We have taken orders for well over 1,000 Level 6 systems in the U.S. alone," Sheehan stated, adding that some of these orders represent development systems which are the "seeds of additional significant orders for this year and next."

The international contribution to the minicomputer business is sizable and by year-end should represent about 40% or 50% of the total minicomputer bookings, he added.

Orders & Installations

The Drug Enforcement Administration of the U.S. Department of Justice has ordered 300 data terminals with associated control unit equipment from Bunker Ramo Corp.

Gold Bond Building Products is installing a Measurex Corp. 2000 digital process control system.

Western Electric has ordered a three-processor C8500 message-switching system from Collins Commercial Telecommunications Division of Rockwell International.

Systems Development Corp. has ordered 17 Systems Engineering Laboratories 32/55 computers for

use in a telemetry integrated processing system at Vandenberg Air Force Base, Calif.

Beacon Industries, Inc. has installed two disk drives, 8K of memory and a 400 line/min printer from Business Systems Technology, Inc.

Optical Research Associates has ordered a Slash 6 computer from Harris Computer Systems to be used in implementing its turnkey optical design package (Code V).

IMS, Inc., a computer systems design and development firm, has installed a Burroughs Corp. B7000 system for design, payroll and general ledger applications.

Security Trust Co. of Rochester, N.Y., has ordered a Commercial Loan Information System from Automated Financial Systems, Inc.

The Honolulu Star-Bulletin and the Honolulu Advertiser are installing T-4000 editorial systems from Tal-Star Computer Systems, Inc. for text processing.

West Bank and Trust, Green Bay, Wis., has ordered an Instant Transactions system from Instant Transactions Corp. of America.

Carter Associates, a computer services firm, has installed a Tandem 16 system for on-line client servicing in general accounting, manufacturing and marketing applications systems.

South Nassau Communities Hospital, Oceanside, N.Y., has installed a Burroughs B1726 system to be used initially for administrative operations including budgetary control, payroll, accounts payable, general ledger and accounts receivable.

American Hardware Supply Co. is installing electronic point-of-sale equipment valued at approximately \$5 million, including 1,000 NCR 250 electronic cash registers equipped with tape cassette recorders.

Public Service Electric & Gas Co. of Newark, N.J., has ordered a Moore Systems, Inc. energy management system built around dual redundant computers that will store and process information from 38 remote pole-mounted terminals and one larger free-standing unit.

Mnemonics, Inc., a software and service firm, has ordered a Data General Corp. Nova 3 minicomputer system to provide market survey tabulation services for its clients.



2323 Industrial Parkway West • Hayward, Ca 94545

NEEDED IMMEDIATELY

Top Prices Paid for Rented or Owned

IBM 3277-2 CRT's

With large screen

Will also buy for future delivery

CALL COLLECT OR WRITE

BERLENT INDUSTRIES INC.

1975 Hempstead Turnpike

East Meadow, N.Y. 11554 (516) 794-9722



Computer Dealers Association

MISSISSIPPI STATE CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Bldg., Jackson, MS 39202, up until 2:00 p.m. 2-28-77 for the following data processing equipment:

Request for Proposal No. 279 General request for proposal for keyboard activated data communication terminals consisting of varying speeds and capabilities. Separate bids should be submitted for hard-copy terminals, cathode ray tube terminals, printer devices, and graphics terminals. These bids will be used to purchase equipment for the State of Mississippi through 1977.

Request for Proposal No. 280 for the purchase or lease of modems or acoustical couplers for terminal communications with various computer systems used by the State of Mississippi, with speeds ranging from 110 baud to 19.2K baud to be used through 1977.

Request for Proposal No. 281 for the purchase of programmable electronic calculator systems to be provided to the State of Mississippi through 1977 ranging in price from \$1500 to \$15,000.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Clyde P. Ballard, Executive Director
Central Data Processing Authority

370/138

370/148

2 YR.

Lease Program

Longer Lease Terms Also Available

We can also handle your European computer requirements as well!

National Computer Rental, Ltd.

415 Madison Avenue

New York, New York 10017

Tel. No. (212)532-1500

Member of Tiger Leasing Group
Member Computer Lessors Assoc.

Univac Sees Industry Growing 16% in '77

BLUE BELL, Pa. — The computer industry will continue the high rate of growth in 1977 that has characterized the industry throughout most of the past decade, according to Univac.

The firm is projecting that gross shipments by all manufacturers worldwide in 1977 will reach a value of \$13.7 billion compared with \$11.9 billion in 1976, representing a 16% growth rate, Gerald G. Probst, president, said.

"Although some countries are currently undergoing lower growth rates in their Gross National Product than heretofore, our experience has shown that the computer market is not necessarily similarly affected," he said.

"On the contrary, the influence of inflationary and recessionary forces often induces business and industry to invest in replacing older DP equipment to take advantage of newer systems offering greater cost-reducing capability," he said.

Over the next 12 months Univac should continue favorable growth

in both revenue and profits, he predicted, with significant contributions to growth coming from large-scale systems and intelligent terminals.

In addition, the newly introduced Univac Distributed Communications Architecture along with its product offering should receive widespread attention from the distributed processing marketplace, he forecast.

"One of our prime strategies is to expand on our existing customer base," Probst said. "Accordingly, we will continue to allocate a considerable part of our resources to building up this base by providing compatible follow-on systems in our product lines for current customers."

"To attract new customers, we will maintain our policy of emphasizing price/performance and ease of conversion."

New Areas of Business

Univac expects to expand its business in new geographic areas such as the USSR, East Europe,

the Middle East and South America.

Corporate plans also stress internal growth by pursuing selected markets and applications and by increasing the productivity of all operations as well as through acquisitions to complement the firm's expansion.

"Joint ventures along the lines of the successful Saab Univac company in Scandinavia and Nippon Univac Kaisha and Oki Univac Kaisha in Japan are other methods we are employing to achieve our growth objectives," Probst commented.

Turning to selected market areas, he said "the state and local government marketplace continues to be one of our strongest growth areas as local authorities strive to cope with inflationary increases in budgets for services by automating an increasing number of functions."

"Illustrative of this trend, we recently received very large orders from state government employment agencies in Ohio, North

Carolina and Massachusetts. In each state, the computer will be concerned with matching unemployed persons with available jobs," he said.

Univac also expects to capture a larger share of the supermarket industry checkout systems business with enhanced scanning and key entry equipment.

"Even in those areas where unit pricing is mandated, supermarkets are achieving significant economies in terms of better inventory control and greater management information from checkout terminals linked to computers," Probst said.

Problem Areas

"Although we are optimistic about the outlook for calendar 1977, we should mention certain problem areas," Probst said.

"These include the continuing currency devaluations in many foreign markets which have affected our profits. Moreover, the twin evils of inflation and recession continue to affect the rate of western Europe's economic recovery."

"Even in the U.S., there has been a noticeable pause in the pace of general business activity. However, we believe that this is only a temporary lull and the business environment will rebound during 1977."

"In spite of these pressures we expect Univac's business to continue to prosper and grow," Probst stated.

Centronics Gets French Nod

HUDSON, N.H. — Centronics Data Computer Corp. has received permission from the French government to form a subsidiary in France to be known as Centronics Data Computer S.A.

The new firm will assume responsibility for the sale, service and support of Centronics' printers and teleprinters in France and North Africa. A spare parts depot and technical support group will be based at the same offices in Paris.

Maintenance service is already available throughout France.

The French office will be Centronics' third European subsidiary to be established over the last 16 months, with existing subsidiaries operational in the UK and West Germany.

"The establishment of our French subsidiary will mark an important step in developing our business in France," according to Max Hugel, executive vice-president of Centronics.

"We are already receiving a most favorable response from our present French customers and we have substantially improved our market opportunities for expanding our French customer base," he added.

Executive Corner

■ Stephen R. McKenzie has been named vice-president of financial marketing for TRW Communications Systems and Services.

■ Warren A. Wasson has been named vice-president of marketing for Action Communication Systems, Inc.

■ W.W. Bearsto has been named executive vice-president and chief operating officer of Systems Dimensions Ltd.

■ Haig Bazoian has been named vice-president of marketing and Robert Ruebel, vice-president of strategic planning, for Xerox Computer Services, a unit of Xerox Corp.

■ O.C. Boxall has been elected a vice-president of Data Card Corp. by the firm's board of directors.

■ Donald A. Bigger has been appointed vice-president of System Development Corp.'s government systems.

■ Pierson Holcombe has been appointed marketing manager/computer products of the Norden division of United Technologies.

■ John H. Underwood has been appointed director, sales and marketing, micro-mini products for Fabri-Tek, Inc.

■ Walter Ciecierski has been

appointed director of engineering for Stelma Telecommunications.

■ John L. Charlton has been named director of marketing and Kenneth R. Bacus as national sales manager of Wabash Tape Corp.

■ David J. Long has been appointed director of technical marketing for the Datawest Corp.

■ Edward J. Heinze has been appointed national sales manager of Ontel Corp.

■ Peter J. MacDonald has been appointed general manager of the electronic components division of Burroughs Corp.'s Federal and Special Systems Group and Gary Y. Buehler as manager of field engineering for the group's Standard Products Division.

■ Chuck Clemente has been appointed manager of marketing communications of Centronics Data Computer Corp.

■ B. Allen Lay will assume the responsibilities of general manager of the business systems division in addition to his role as senior vice-president, general manager for the CMC group of Pertec Computer Corp.

■ Gordon D. Christiansen has joined the Amacom, Inc. staff as

vice-president of engineering.

■ Raymond V. Sozzi has been named vice-president of Genesis One Corp.'s wholly owned subsidiary, Management Assistance, Inc. (MAI).

■ Larry Martin has been named vice-president of information services by Keane Associates, Inc.

■ J.F. Magosin, Jr. has been elected vice-president of marketing by Automated Financial Systems, Inc. (AFS).

■ Ronald O. Huch has resigned as vice-president of planning for Centronics Data Computer Corp.

■ Serge Blinder has been appointed vice-president of marketing; William H. Gallagher, vice-president of development; Robert W. Howe, vice-president of operations and Phillip J. Legro, vice-president of finance for Savings Management Computer Corp.

■ David Adams has been promoted to vice-president of sales for the ACTS Computing division of Lear Siegler, Inc.

■ Lloyd D. Baldwin has been promoted to administrative vice-president of Pansophic Systems, Inc.

■ Howard Wasserman has been appointed vice-president of marketing for Unitrode Corp.

Nickels & Dimes

Bolt Beranek and Newman has declared a semiannual dividend of 10 cents payable March 1 to holders of record Feb. 14.

\$\$\$

Scientific Software has extended the warrants to purchase its common stock until Jan. 5, 1980. The warrants were to have expired on Jan. 5, 1977.

\$\$\$

National CSS has instituted a program to repurchase up to 15,000 shares of its common stock. These treasury shares will be used exclusively to fund the firm's nonqualified stock option program and/or its qualified stock purchase plan for employees.

The acquisition period is expected to extend until Feb. 28.

Datum's, third-quarter loss of almost \$1.2 million stemmed from a \$1.3 million write-off of inventory, intangible assets and adjustments for cost overruns of several contracts.

\$\$\$

Entrex has completed a \$5.88 million private placement with a group of institutional investors. Proceeds will be used to finance leasing operations and the anticipated growth of the 600 series and to expand domestic marketing operations.

\$\$\$

Compuscan has added more than \$3.3 million to its current order backlog for optical character recognition equipment, raising its backlog to \$8.1 million compared with \$5.6 million a year ago.

Earnings Reports

DIGILOG SYSTEMS

Year Ended Sept. 30

	1976	1975
Shr Ernd	\$51
Revenue	2,503,951	\$1,893,010
Tax Cred	152,000
Earnings	344,033	(440,243)

DIGITAL EQUIPMENT

Three Months Ended Oct. 2

	1976	1975
Shr Ernd	\$1.29	\$.95
Revenue	204,542,000	140,458,000
Earnings	16,705,000	11,390,000

DOCUTEL

Three Months Ended Sept. 30

	1976	1975
Shr Ernd	\$20	\$17
Revenue	8,267,000	7,362,000
Tax Cred	254,000	194,000
Earnings	511,000	432,000
9 Mo Shr	.70	.25
Revenue	24,937,000	19,627,000
Tax Cred	898,000	288,000
Earnings	1,811,000	640,000

ELECTRONIC DATA SYSTEMS

Three Months Ended Sept. 30

	1976	1975
Shr Ernd	\$26	\$.29
Revenue	35,706,000	32,085,000
Earnings	3,297,000	3,518,000

ELECTRONIC TABULATING

Nine Months Ended Sept. 30

	1976	1975
Shr Ernd	\$.75	\$.59
Revenue	2,607,177	2,366,701
Earnings	321,396	252,380

DATA 100

Three Months Ended Sept. 30

	1976	1975
Shr Ernd	\$31	\$.51
Revenue	30,178,000	24,638,000
Revenue	87,897,000	67,896,000
Tax Cred	373,000	780,000
Earnings	1,147,000	1,847,000
9 Mo Shr	.95	1.35
Revenue	858,000	2,038,000
Earnings	3,525,000	4,840,000

PERKIN-ELMER

Three Months Ended Oct. 31

	1976	1975
Shr Ernd	\$.25	\$.20
Revenue	85,300,000	76,183,000
Earnings	4,789,000	3,785,000

UNITRODE

Three Months Ended Oct. 31

	1976	1975
Shr Ernd	\$.23	\$.15
Revenue	7,827,704	6,824,618
Earnings	574,860	376,685
9 Mo Shr	.63	.51
Revenue	22,553,319	20,636,779
Earnings	1,582,277	1,248,643

COMPUTER ELECTION SYSTEMS

Three Months Ended Sept. 30

	1976	1975
Shr Ernd	\$.79	\$.25
Revenue	5,241,175	2,045,364
Earnings	990,285	316,466
6 Mo Shr	.65	.11
Revenue	6,289,693	2,498,447
Earnings	813,746	129,329

POSITION ANNOUNCEMENTS

COMPUTER PROGRAMMER/ANALYST

Growing EDP department with Dual B/4700's and heavy DCOM requires experienced programmer analyst to meet increasing demands of large Cleveland medical center. Successful applicants must have at least 2 years post high school education in data processing and 2 years programmer/analyst experience. Burroughs medium system experience preferred. Call collect, or send resume to:

(216) 444-2678 (collect)

The Cleveland Clinic Foundation

9500 Euclid Avenue, Cleveland, Ohio 44106

We Are An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

FIELD ENGINEERS

Los Angeles
Houston
Knoxville
Atlanta

Boston
Rochester
San Francisco
Albany

SORBUS INC., the country's leading independent computer and business equipment maintenance company, has immediate employment opportunities in the above cities, and others, for Field Engineers with experience and training on any of the following equipment: IBM 360 & related, Mini's & peripherals, and terminals.

These positions provide excellent compensation, challenge, and an environment conducive to personal and professional growth. If you're interested in working for a progressive company with an excellent growth record and a bright

future, call toll-free 800-523-5632, or send your resume to: Bill Patch, Personnel Director, SORBUS INC., 150 Allendale Road, King of Prussia, PA 19406. An Affirmative Action Employer.



SORBUS INC.
an M/AI company

PROFESSIONALS ONLY

If you are a programmer-programmer/analyst, systems analyst, or EDP professional and would like the most individualized job search offered in the data processing field today on a local or national level, forward your resume, with present salary and geographical preference, in strict confidence, to:

E.D.P. SEARCH, Inc.
P.O. Box 331
Hartford, Conn. 06105

SYSTEMS DESIGNER

Our client, an established Southern firm, seeks your talents to choose and install a small business computer, then manage the department. Requires experience in systems design and programming. \$17,000 FEE PAID.

ROBERT HALF PERSONNEL AGENCIES
12 S. Main Street
Memphis, TN 38103
(901) 523-8950

New Hampshire Beckons**PROGRAMMER ANALYST**

The PEERLESS Insurance Company, in beautiful Keene, New Hampshire, needs PROGRAMMER/ANALYSTS with varying degrees of experience.

TWO OR MORE YEARS EXPERIENCE in auto insurance applications. BAL is a plus, but we will consider COBOL experienced people to train. For BAL on 3rd generation equipment.

NO INSURANCE APPLICATION experience required, but 2 to 3 years BAL 3rd generation equipment experience is a must. Many opportunities open.

Keene is one of New Hampshire's nicest communities. New Hampshire has NO state sales or income taxes. If you want to work and recreate in a rural setting that's close to metropolitan areas, send full resume in complete confidence to:

Michael Cabot
Peerless Insurance Co.
62 Maple Avenue
Keene, N. H. 03431
— or call — 1-(800)-258-5303

An Equal Opportunity Employer M/F

NEW JSY OPPTYS!

In our 18th year, we now represent top financial & industrial cos in N.J. Openings are for jr/sr programmers & systems exper. Rush resume to S. Devaney, & state present income & requirements-or call. Our widely accepted resume outline is avail for the asking. All fees pd.

don HOWARD Personnel Inc.

100 Menlo Pk., Edison, NJ 08817 • 201-494-3410
NYC • NJ • Chicago • Atlanta • S.F. • Dallas

NATIONS HEADQUARTERS FOR EDP/SYSTEMS PERSONNEL

PROGRAMMER ANALYST

Requires degree in Chemical Engineering, Chemistry, Math or Statistics with experience in process simulation, mathematical modeling and statistical applications. The person we seek will have at least 3 years of industrial Fortran programming experience and a strong ability to communicate and get along with others. Salary commensurate with experience. Interested applicants should send resume including salary history and requirements to:

OCCIDENTAL RESEARCH CORP.

P.O. Box 310, Dept. 7
La Verne, Calif. 91750
Equal opportunity employer

MANAGER SYSTEMS PROGRAMMING

Rand Corporation, a leader in research applied to national problems, seeks a senior systems manager to assume management of all facets of control system design and implementation for the corporation's computing facility. Responsibilities include technical leadership of 10 system programmers supporting a MVT/HASP based 370/158 migrating to MVS, a PDP11/70-11/45 facility utilizing UNIX, a node on the ARPA network, and a WYLBUR online and RJE system. Currently planned are the installation of an AP and TSO.

Qualified candidates will possess a degree in Computer Science or related field and extensive experience in all aspects of control system programming including MVT/HASP and online systems. MVS experience helpful. Supervisory experience of a minimum of 5 system programmers required.

Send resume establishing qualifications, full employment and earnings history, and salary requirements to Kenneth R. Logan.

The Rand Corporation
1700 Main Street
Santa Monica, CA 90406
An Affirmative Action Employer

Software Professionals:

If You're Open To New Techniques and Ideas—

You Should Be At Digital-Marlboro.

We're the Software Services Group for the large computer systems — DECsystem-10 and DECsystem-20 and networks for both large computers and mini's. We pride ourselves in being a rapidly growing, technically-integrated group that has earned the respect of our entire corporation.

If you appreciate working in an exciting and innovative atmosphere, then you should investigate Digital Marlboro.

Software Product Support Specialists

We currently have several excellent opportunities available for technically skilled software support professionals in the areas of:

- Communications and networks (for both large systems and minicomputers)
- Data base management
- Operating systems (TOPS-10 and TOPS-20)

Solid technical knowledge and experience in the above areas is desirable.

You'll be supporting our DECsystem-10, DECsystem-20 and networks field specialists worldwide, primarily solving customer problems either at our Marlboro facility or on site. In addition, you'll interface with users, technical, marketing, and development personnel and will solve user problems based on technical requirements. If you appreciate a real technical challenge and are growth and result-oriented, this is the position you've been waiting for.

Software Product Services Analyst

In this high-visibility position, you will be a major contributor to the internal planning of our systems software, primarily DECsystem-10, DECsystem-20 and networks for both large systems and minicomputers. You will be responsible for establishing plans and strategies for the support and maintenance of our software products:

- Ascertain and project field expertise required for support of DEC-10 and DEC-20 products and minicomputers.
- Propose and implement product support plans.
- Strong interface responsibilities with home office and field management.

A technical background and planning/managerial experience is desirable for this position.

Representatives of Digital Equipment Corporation will be at the Association for Computing Machinery Conference at a midtown hotel in Atlanta, Georgia, on January 30-February 2, 1977 to conduct interviews for the above opportunities. For an appointment, please call (404) 659-7118 during the aforementioned times.

If unable to meet with us at this time, please direct your resume to Carol Reed, Digital Equipment Corporation, 200 Forest Street, Marlboro, Massachusetts 01752.

digital
digital equipment corporation

an equal opportunity employer m/f

position announcements

DATA PROCESSING
MANAGER

NORTHERN CALIFORNIA

McClatchy newspapers, a multi-plant group of newspapers with radio and television stations, has challenging position at corporate level in Sacramento for data processing manager with strong experience and supervisory background. Should have minimum two years supervisory experience in medium sized DP shop with 3rd generation equipment. Good salary plus liberal vacation, medical and retirement benefits. All replies held in strict confidence. Send detailed resume including availability for personal interview to:

Personnel Department
McClatchy Newspapers
21st & Q
Sacramento, California 95813
An Equal Opportunity Employer

PROGRAMMER/ANALYST

All it takes is 2-3 years of programming experience in COBOL or ALC in a 370 environment to join a progressive data processing department of a life insurance company in Battle Creek, Michigan. Challenging opportunities exist within the following framework:

- MVS-370/168, DOS/VS - 370/145
- Remote Processing/Data Transmission
- On-line Test/Debug - TSO, VM, CMS
- IMS Data Base Management
- CICS On-Line Systems

Additional experience in any of the above, a plus. Interested?? Send your resume, including salary history and requirements to K.C. Brown, Federal Life and Casualty Co., 78 West Michigan Avenue, Battle Creek, Michigan 49016. Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements



Improve your future when you join E-Systems. E-Systems is a leader in reconnaissance and intelligence gathering systems, electronics surveillance and other defense programs of a passive nature. We're a high technology systems company with annual sales of over \$250 million. We market products and services in more than 40 different countries. Our stock is listed on the New York Stock Exchange. You'll own some of that stock if you come with the E-Team.

Make a good living where the living is good. There's no question — living is good in the Dallas area. Our public school systems have earned national recognition for excellence. We're one of the fastest growing areas in the nation, yet our housing dollar still buys considerably more home in Dallas than it would in most other metropolitan areas. We're surrounded by lakes, and blessed by beautiful weather year 'round. We back professional, university, and high school athletic teams, and we support our symphony, theaters, the civic opera and several museums. But, best of all, most of us are down home friendly people.

Product Software
Programmers

Computer science professional with three or more years of real time programming experience using ALC on large scale and 16-bit mini-computers. You will be involved in program development, design, and analysis for large scale multi-tasking systems in advanced technology electronics. If you have had actual experience in product software programming, have a stable

employment history, and a record of professional achievement, mail your resume today.



E-SYSTEMS

Garland Division

An equal opportunity M/F employer
US Citizenship Required

If you qualify, send your resume with salary history to:

Computer Science Manager
E-Systems, Inc.
P.O. Box 6118/Dallas, Texas 75222

PROGRAMMER
SOFTWARE SUPPORT

Addition to staff has created a challenging position in our System Support team. Experience in the internal code and control of OS/MVT, IMS, VM, JCC/20, TSO or DOS would help an individual in learning this job.

This position is at our corporate offices in Minneapolis. Starting salary based on applicable experience. Excellent fringe benefits including air travel. Send detailed resume or call (612) 726-7668. NORTH CENTRAL AIRLINES, INC. Employment Office 7500 Northliner Drive Minneapolis, MN 55450 an equal opportunity employer

Municipal

Analyst/Programmer

Startup computer installation seeks a designer/implementor to computerize a variety of interlocking systems. Accounting, programming, and systems design experience required. Dynamic environment needs a hard working problem solver, communicator, educator and diplomat. Two years of business programming and design experience expected. Accounting degree and online/DBMS experience highly desired. Salary \$18-20K.

Consulting Systems Analyst

Technically creative self-starter needed for one-year assignment. Possibility of continuation may be earned. Initially will travel to NYS cities to analyze and document payroll/personnel applications. Subsequently will produce detailed specifications and develop local payroll/personnel system, etc. Require polished communications skills — including documentation design, and analyst/programmer expertise (3+ years). Salary \$18-20K.

Resumes with salary history by

February 4, 1977
Gerald F. Johnson
Director of Finance
City of New Rochelle
515 North Avenue
New Rochelle, N.Y. 10801
CNR is an AA/EO Employer

NCR's newest facility, the Data Processing Division in Wichita, offers growth opportunities for ambitious individuals to work on state-of-the-art, next generation, small business computer systems and associated equipment. Wichita's air is among the cleanest... school systems are among the finest in the country. We welcome an opportunity to discuss employment with you!

SENIOR DATA BASE
MANAGEMENT ENGINEER

Minimum of 5 years experience in implementation of a data base management, operating or communications system. High degree of visibility within the organization reporting to the Advanced Development Manager.

SYSTEMS SOFTWARE PROGRAMMERS

- Communications • File Management
- Minicomputer Operating Systems
- Firmware Development • Diagnostic Systems Designers
- Compiler Designers • Assembly Level Programmers

SYSTEMS HARDWARE DESIGN

- Real-time Architectures and Development with experience with on-line minicomputer applications.
- Network Design and Communications Control for Distributed Processing Systems.
- Minicomputer Hardware/Software Design Trade-off.
- Terminal and Peripheral Interface Design.

NETWORK DESIGN

- Node Control • Distributed File Management
- Terminal Handling • Computer Communications

SEMICONDUCTOR COMPONENT ENGINEER

- 2 or more years experience with emphasis in:
- Evaluation and Specification of Semiconductor Components
- Discrete, Digital and Linear IC's

DESIGN AUTOMATION ENGINEER

- BSEE degree with minimum of 3 to 5 years experience.
- Familiar with Fortran, Logic Simulation, Systems Simulation, and P.C. Board Design.

COMMUNICATIONS SYSTEMS ENGINEERS

A degree in engineering, computer science or equivalent is required with preference being an advanced degree. An MBA would be a substantial asset. Applicant must have strong systems orientation and substantial experience with communication systems. In-depth knowledge in one or more of the following areas are desired:

- Operating System Provisions toward communication, including communication access methods.
- Communication processor architecture.
- Communication link disciplines.
- Communication systems diagnostics.

Send resume including salary history to: Max Anderson, Professional Placement, Dept. CN, 3718 N. Rock Road, Wichita, Kansas 67226.

An Equal Opportunity Employer

NCR

Data Processing Division — Wichita

SYSTEMS
ANALYST

Company is a leader in its field of specialized insurance. Forming a new department to design applications for its IBM 370/OS system. A vigorous and growing MIS dept. \$23,000. FEE PAID

ROBERT HALF
PERSONNEL AGENCIES
522 Fifth Ave.
New York, N.Y. 10036
(212) 221-6500

ASST. DIRECTOR/ANALYST
OF DATA PROCESSING
ODESSA COLLEGE

Primary job responsibilities include serving as Senior Analyst/Programmer in design, programming, and implementation of On-Line Student Registration System on a UNIVAC 9480 with IMS-90. Minimum of 3-4 years of recent Cobol programming and System Analyst experience required. Basic RPG and BAL desired, but not required. Bachelors degree preferred. TP experience a definite asset. Salary to \$16,500, depending on education and experience. Application deadline: February 28. Direct inquiries to Assistant to the President, Odessa College, Odessa, TX 79760; (915) 337-5381, ext. 352. An Equal Opportunity Employer

SYSTEMS ANALYST

University of Northern Iowa Assists administrative staff in defining their information processing needs; designs data processing systems for their information needs; writes programs and oversees programs of the programmer analysts assigned to the projects. Qualifications for position: Computer Science, math, or Business related degree with a minimum of three years of experience with COBOL and IBM OS-JCL. The hiring salary range is \$14,500 to \$17,000 depending upon training and experience; an excellent fringe benefit program is available. All interested and qualified applicants should submit their letter of application and resumes complete with salary requirements to Dick Cottrill, Associate Director, Personnel Services, University of Northern Iowa, Cedar Falls, IA 50613 prior to February 15, 1977.

The University of Northern Iowa is an EEO/AA employer. Members of the protected classes may identify themselves for purpose of Affirmative Action.

WANTED:

Hardware/software experts
to help build new
computers to match the
world's best software.

Telefile Computer Products, Inc., the only supplier of new peripherals and main memory for Xerox computer users, is embarking on a new challenge:

The development of two new Sigma computers. They will extend the line's capabilities well into the 1980's and take full advantage of Xerox' state-of-the-art CP-V and CP-R operating systems... software that the latest Datapro Research survey* shows as ranking first in the world.

Sigma 9 computer

- Will be micro-programmed
- Schottky MSI circuitry
- Prototype completion 12/77
- Full production by 12/78

Sigma 11 computer

- 4 X faster than present S9
- One-half the price
- ECL logic
- Full production by 12/79

All standard Telefile and Xerox I/O processors, main memory, and peripherals will be plug-compatible with both machines.

Telefile, located in the heart of California's sun-filled, dynamic Orange Coast, is staffing up now and needs these highly skilled professionals to help:

- CP-V and CP-R Development Programmers
- Programmers (All Languages)
- CP-V and CP-R Analysts
- Firmware Designers
- Comp. Architecture Designers
- Semi and Core Memory Designers
- ECL Logic Designers

Only highly qualified applicants need apply for this exciting new venture with a computer company that has shown an average annual growth of over 50% five years in a row. Send resume and salary history to:

Mr. S. V. Edens, President
Telefile Computer Products, Inc.
17131 Daimler Street, Irvine, CA 92714

Telefile

An Equal Opportunity Employer M/F
*Computerworld, December 6, 1976

Telefile
does it
again.

FLORIDA

HARDWARE/SOFTWARE
ENGINEERS/PROGRAMMERS

Positions throughout Fla. for technical talent engaged in computer systems design and applications, data and voice communications, microprocessor design or application, RT mini computer software design and application, etc. Fee paid, salaries 14-22K.

DAVE STANEWICK & ASSOCIATES, INC.

9300 S. Dadeland Boulevard
Suite 508
Miami, Florida 33156
(305) 666-5881

First Class
Permit No. 1531
Ann Arbor
Michigan

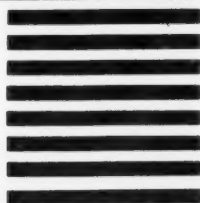
Business Reply Mail

No postage stamp necessary if mailed in the United States

Postage will be paid by

SYCOR

Corporate Offices
Ann Arbor, Michigan 48104



Attn: MS#1

I'd like to find out more about how Sycor's distributed data entry and processing equipment can take the load off my mainframe.

☐ Please have a sales representative call.

Send me information on:

☐ Sycor Model 350.

☐ Other Sycor distributed processing systems.

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

Sycor puts computer power where the work is.

Computerworld

position announcements

position announcements

position announcements

position announcements

position announcements

DATA PROCESSING MARKETING SPECIALIST

We are a leading, worldwide consulting company with an outstanding record of providing facilities management to federal, state and local governments and to private industry. We seek a Senior Data Processing Marketing Specialist to enhance our corporate staff. This person will be currently successful in developing data processing marketing plans, programs and strategies for city governments throughout the United States.

This position is based in California with substantial nationwide travel. A basic compensation package in the area of \$40,000 plus incentives is anticipated for the qualified candidate. Our requirement is immediate.

CW Box 4878
797 Washington St.
Newton, Mass. 02160

An equal opportunity employer M/F

SYSTEMS ANALYSTS/ SCIENTIFIC PROGRAMMERS

Interactive

Growing company has excellent opportunities for individuals with degree in engineering, mathematics or equivalent experience to work on state of the art interactive design drafting system.

Successful candidates must have experience in machine language and higher level language on digital scientific computers. Background in data base design, computer graphics or time shared operating systems an asset.

Excellent starting salary, ideal professional environment and full fringe benefit program. Relocation expenses paid to this ideal area for living and working.

To arrange confidential interview send resume to:

Watson Peterson, Jr., ... Director of Personnel

Gerber Scientific

Instrument Company

83 Gerber Road, South Windsor, Conn. 06074

An equal opportunity employer M/F

Systems Programmers

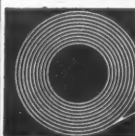
Avco Computer Services, one of the largest and fastest growing computer centers in New England, is seeking professional programmers experienced in any of the following areas:

- MVT/SVS/MVS
- HASP/JES2
- COMMUNICATIONS
- TSO

Challenging and rewarding operating system work will be offered to imaginative people on a loosely coupled 2 megabyte 360/75 - 4 megabyte 370/158 multiprocessing system.

Avco offers a liberal benefit program and excellent salary commensurate with your educational and professional background, in addition to aid for advanced education.

Kindly send your resume, including salary requirements, to:
Mr. Peter C. Dowd,
Employment Supervisor



**AVCO
COMPUTER
SERVICES**

201 LOWELL STREET
WILMINGTON, MASSACHUSETTS 01887

An equal opportunity employer, M/F

AVCO CORPORATION

YOUR COMPUTER CAN'T
FIND THE JOB FOR YOU.
OURS CAN.

**National
Personnel
Associates®**

175 Professional Firms
in 130 Metro Areas

JIM KING & ASSOC.
EDP Division
438 Gulf Life Tower
Jacksonville, Fla. 32207
(904) 398-7371

AVAILABILITY, INC.
Data Services Consultants
1300 N. Westshore Blvd.
Tampa, Fla. 33607
(813) 872-2631

DEALY-ROURKE
PERSONNEL SERVICE

EDP Division
Suite 121, 1808 W. End Bldg.
Nashville, Tenn. 37203
(615) 329-1771

Specialists in the placement of
EDP Professionals.

**DEC
RSX11
FORTRAN**

We have an urgent requirement for programmers & analysts with a good knowledge of the above, for varied work with the American subsidiary of a large British Software House.

CALL: Miss Sally Summers

(212) 867-0870

ACS AMERICA INC.

EDP MANAGER

Distribution Company located in Waltham, Mass. needs a hands-on manager to supervise its DP activities and to assist in further developing its on line system. Knowledge of IBM System 3, Model 15, RPG II and CCP desirable. Salary range is negotiable depending on individual's qualifications. Inquiries will be held in strict confidence. Send resume to:

CW Box 4882
797 Washington St.
Newton, Mass. 02160

Information System Specialist

On-Line System
Administration

Kaiser Foundation Medical Care Program is seeking an exceptional individual to support the design, development and implementation of large scale, data-base telecommunication application systems. If you are ready for greater challenge and responsibility and possess most of the following criteria, then we would like to talk to you.

Proven track record as a senior or a staff of data processing professionals who have developed data base telecommunication systems which are successfully operational. Currently working in an IBM 370 OS/VS IMS data-base CICS structured programming environment. Strong leader, people motivator and effective communicator at all levels in the organization. Fundamental business knowledge and attitude.

We offer an excellent starting and above average fringe benefit package. For immediate consideration, please forward resume, with salary history and requirements to Personnel Supervisor, Dept. SR-10, P.O. Box 12916, Oakland, CA 94604. We are an equal opportunity employer, m/f.

**Kaiser
Permanente**

New Careers in Software

San Francisco Peninsula

The creation of our new Software Technology Department in Special Programs Operation at Ford Aerospace and Communications Corporation has resulted in a need for a number of senior analysts or computer systems specialists. The individuals we are looking for will have advanced degrees and/or three years' experience in one or more of the following disciplines:

- Software engineering/software development methodology
- Data base management/distributed processing
- Image processing
- Minicomputer based systems (PDP-11, SEL 32, Eclipse)
- Computer networking/ARPANET protocols
- Microprocessor software development
- Operating systems (UNIX, RSX-11D)

We offer outstanding compensation and benefits packages, coupled with the opportunity and challenge of working in this new area. For immediate and confidential consideration, please forward resume and salary history to Professional Employment, Dept. JLL-1.

Ford Aerospace & Communications Corporation

Western Development Laboratories Division

3939 Fabian Way

Palo Alto, California 94303

An equal opportunity employer m/f

PROGRAMMER/ ASSEMBLER

A programmer with a minimum of 2 years of assembler experience, who aims at extending his or her professional capabilities in a high challenge environment, should check out RJR's opportunities for several reasons.

- One is diversity. As a Fortune 500 corporation, RJR is heavily involved in many growth industries, including food, tobacco, metals, transportation, packaging and petroleum.
- Another is our commitment to maximizing the ways in which our computer facilities can be utilized, which means multiple applications ranging from marketing to process control to warehousing, using 370/158's and 145's.
- And the value we place on EDP skill is demonstrated by the salary structure in this area and the excellent benefits package that accompanies this. We are situated in one of the most attractive living areas on the East Coast.

Planned growth is creating new openings for assembler programmers with experience in on-line programming, a working knowledge of DOS and/or OS, and the respective control language. A degree or comparable experience is desired.

If you qualify, we'll be pleased to talk with you. Write, in confidence, including resume and salary requirements, to: Mr. Denis C. Simon, Manager of Employment, R.J. Reynolds Industries, Inc., 401 North Main St., Winston-Salem, N.C. 27012.

RJR

R.J. Reynolds Industries, Inc.

Tobacco Products Packaging
Foods & Beverages Transportation
Oil & Gas

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

OPPORTUNITY UNLIMITED!

We are designing & implementing an integrated data base system on IBM 370 hardware. We are seeking key professionals with the ability to work with an international consulting firm. We need the following classifications to join our development team:

**DATA BASE ANALYST
SYSTEM ANALYST
SR. PROGRAMMER
PROGRAMMER**

We are using OS/VS1, IMS, CICS, COBOL. Opportunities for advancement are above average. Opportunities for professional growth are tremendous. Salary & benefits are competitive. Job located in Houston, Tx. Please reply in confidence to:

CW Box 4885
797 Washington Street
Newton, Mass. 02160
Equal Opportunity Employer

COMMUNICATIONS PROGRAMMER

Sycor, Inc., a dynamic, young company and a leading manufacturer of intelligent terminals, has a growth-oriented opening in the Ann Arbor area for a Communications Programmer.

Minimum three years experience in real time programming. Experience with IBM communications access methods (BTAM, TCAM, VTAM, etc.) and communications oriented control programs (CICS, etc.) also desirable. At least BS in Computer Science or equivalent is needed, but MS preferred.

Please send resume and salary history to:

Gopi R. Jindal, PhD.
Manager, Professional Employment, Sycor, Inc.
100 Phoenix Drive
Ann Arbor, Michigan 48104

As an Equal Opportunity and Affirmative Action Employer, Sycor, Inc., Urges Females and Members of Minority Groups to Apply.

Sycor, Inc.
An Intelligent Idea

Computer Professionals:

**YOU'RE FREE
TO GO WHERE
YOU WANT.**



Many of us dream about moving to some favored area of our country. Few of us actually do it because the problems seem insurmountable.

But not for computer professionals! Now you have the freedom to realize your dreams. That's what NCA is all about. Our major purpose is to make your relocation a simple matter. Through our network of offices we can find you the position you want wherever in America you want to live... and before you move. Furthermore, most employers pay relocation costs. All employers pay our fees.

Exercise your new found freedom. Contact the NCA office in your area.

National Computer Associates

CHICAGO
McCormick & Associates, Inc.
360 North York Street
Evanston, Illinois 60126

DALLAS
Data Processing Careers, Inc.
Suite 1109
Stemmons Tower West
Dallas, Texas 75207

DETROIT
Electronic Systems Personnel
1705 Fisher Building
Detroit, Michigan 48202

FLORIDA
Data Sciences Personnel, Inc.
Suite 205, 15490 N.W. 7th Ave.
Miami, Florida 33160

HARTFORD
Compas, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105

LOS ANGELES
Constellation Enterprises
Suite 900, 3250 Wilshire Blvd.
Los Angeles, California 90010

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
801 Nicollet Mall, Suite 1718
Minneapolis, Minnesota 55402

NEW YORK
Batal Associates, Inc.
405 Lexington Avenue
New York, New York 10017

NORTH CAROLINA
TaskForce, Inc.
1048 E. Wendover Ave.
P.O. Box 8888
Greensboro, N. Carolina 27405

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wallingford, Pa. 19088

PITTSBURGH
Electronic Systems Personnel
106 Lawyers Building
428 Forbes Avenue
Pittsburgh, Pennsylvania 15219

Computer Personnel Firms interested in NCA Membership,
write to: J. McNamara, 2990 W. Grand Blvd., Detroit, Mich. 48202

SAN FRANCISCO
The Computer Resources Group
Agency, Inc.
303 Sacramento Street
San Francisco, California 94111

SYRACUSE
CFA Associates Personnel, Inc.
(Agency)
2530 James Street
Syracuse, New York 13206

TULSA
Data Processing Careers, Inc.
Suite 10, Park 21 Building
2626 East 21st Street
Tulsa, Oklahoma 74114

WASHINGTON, D.C.
ESP Systems Corporation
Suite 210
1211 Connecticut Avenue N.W.
Washington, D.C. 20036

GRAPHICS SYSTEMS

N. England Industri has immed need for indiv with exp in: Interactive graphics; "plotting" systems; graphics software; structural analysis, etc. Engineering degree pref'd. Salary to \$20,000+. Contact Stan Durbas.

**ROBERT HALF
PERSONNEL AGENCIES**

111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170

SYSTEMS &

PROGRAMMING MANAGER

The City of Tacoma, a progressive northwest city, is offering a challenging opportunity to manage a systems & programming staff of 24 persons with complete responsibilities for new project development, systems maintenance and systems programming. Desirable qualifications for this position include a college degree, an operations as well as a systems background, experience with IBM computers and experience in municipal data processing applications.

Applicants should have a minimum of five years data processing experience with demonstrated managerial capabilities. Management style should be results oriented and excellent communications skills a must.

The City of Tacoma provides a comprehensive fringe benefit package and the salary range for this position is \$1,800/month to \$2,187/month.

Qualified candidates should submit their qualifications, employment and salary history, and references no later than February 4, 1977.

To: City of Tacoma
Personnel Department
Room 531
County-City Building
Tacoma, Washington 98402

Equal Opportunity Employer

MANAGEMENT INFORMATION ANALYST \$18,000-\$20,000 Annually

Opportunity for an experienced analyst to develop on-line, data based municipal systems. Analyst will be working on a mini-computer using a DBMS with Query and COBOL. Requirements include an accounting, business or math major with a minimum of 3 years EDP systems experience. Mountain View is near Stanford University in the San Francisco Bay Area. Final filing date is February 14, 1977. Send resume to City of Mountain View, Personnel Office, P.O. Box 10, Mountain View, CA 94042 (415) 967-7211, EXT. 273.

DP OPPORTUNITIES

If you are interested in the Washington, DC area, the following are a few of the opportunities awaiting you.

IMS P/A, OS	To \$22K
CICS, COBOL or ALC	To \$20K
Sys, progs, internals,	To \$24K
HASP, CICS, TSO	To \$18K
COBOL, OS or DOS	To \$15K
RPGII, DCL, CDP	To \$18K
U-1100, EXEC 8	To \$18K
COBOL, FORTRAN	To \$18K
ALC, MACROS, DBMS	To \$33K
Soft. Devel. Mgr OS	To \$18K
Progs, PL1 or	To \$18K
FORTRAN	

Call or mail your resume in confidence to Don Richard Associates, 7315 Wisconsin Ave., Ste. 726, Washington, DC 20014 (301) 652-1182. All positions fee paid.

SENIOR PROGRAMMER ANALYST PROGRAMMERS

Union Planters National Bank of Memphis, the Southeast's leading bank in the field of EFT and POS, is seeking DP talent to add to its staff of computer professionals. Union Planters has immediate openings for programmers and Senior Programmer Analysts in its large IBM 360/OS MVT installation. Experience with COBOL and OS environment is required and additional experience with IMS and assembler is desirable. Programmers should have 1-2 years experience and Senior Programmer Analysts should have at least 3 years experience as indicated above. Salary commensurate with experience.

Submit resume and salary history in confidence to:

**UNION PLANTERS
NATIONAL BANK**
Personnel Services
P.O. Box 387
Memphis, TN 38147

Equal Opportunity Employer M/F

DATA BASE ADMINSTRATNOR

We are a progressive leader in the health care field with excellent opportunity for an individual with 2-3 years data processing experience in a large scale IBM 370/168, 158) OS/VS environment.

Experience in systems programming or technical support, and some IMS background is also desirable for this position. Responsibilities will include data base design and implementation, monitoring and evaluation of DBMS, and specified involvement in the technical aspects of IMS.

If you are looking for a challenging opportunity to expand your data processing background, consider joining us in an exciting future. We offer an excellent salary and a complete benefit package.

Send resume and salary requirements to:

BLUE CROSS OF WISCONSIN

Personnel Department
4115 No. Teutonia Avenue
Milwaukee, Wisconsin 53201

Technical Support Specialist

Intersil, recognized for its achievements in developing a broad spectrum of semiconductor devices seeks a talented technical support specialist for our Cupertino, Calif., headquarters.

To qualify, you should have IBM systems 360/370 hardware support experience plus thorough knowledge of IBM CPU diagnostic usage. Working knowledge of software and/or training helpful.

For immediate consideration, please send your resume to Intersil Employment, 10900 N. Tantau, Cupertino, CA 95014. An Equal Opportunity Employer M/F.

Intersil



DATA PROCESSING: TRAINING COORDINATOR

**Could You Establish and Administer
A Training Program In An OS/MVT Environment?**

CARS, Computerized Automotive Reporting Service, and its data processing company, Action Computer Technology, Inc. (ACT), have established the industry's leading data processing operation to provide comprehensive accounting, inventory, and leasing services to automotive dealerships throughout the U.S., Australia and Japan. We are currently seeking a Programmer Analyst with experience in the OS/MVT environment to establish and administer a training program at our Birmingham headquarters. This position requires your ability in administrative management a thorough knowledge of COBOL and OS JCL, plus patience, the desire to learn new techniques, and the ability to work well with people. We offer excellent income, a comprehensive benefit program and outstanding career growth potential.

FOR IMMEDIATE AND CONFIDENTIAL ATTENTION, PLEASE DIRECT YOUR RESUME TO:

Perry W. Turner
Personnel Manager
(205) 956-8020, ext. 363
or write

CARS, INC.

P.O. Box 235
Birmingham, Alabama 35201

CARS

ACT

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER CONTROL SYSTEMS

Administrator, Computer Control Systems

A position in the computer controls area of material handling systems, using state-of-the-art technology; must have experience with both computer hardware and software products; systems analysis, design, development and installation of automated systems. Individual must be highly self-motivated, comfortable with detail, capable of working with little supervision, ability to interface with and coordinate various departments, vendors and customer personnel. Responsible for both pre and post-sales activities.

Degree in engineering, business or computer science plus a minimum of 6 years experience in computer systems and related fields (preferably both data processing and process control applications). Experience in material handling and mini-computer systems desirable; real time software and control electronics hardware; computer sizing and project time estimating are a plus.

Senior Programmer/Analyst

A position for a person with experience in design, development and installation of computer control systems; real-time applications; FORTRAN and assembly languages; mini-computer hardware and software. Must be customer oriented and experienced in dealing with customer problems.

Degree in engineering, business or computer sciences plus a minimum of 6 years programming experience in data processing and sensor based systems.

Location is Eastern Pennsylvania and positions will involve a nominal amount of travel.

Send resume to J. Magee, Personnel Manager, P.O. Box 70, Easton, Penna. 18042

SI HANDLING SYSTEMS, INC.



Equal Opportunity Employer M/F

data processing



**SR. TELEPROCESSING
SYSTEMS PROGRAMMER
SR. MVS SYSTEMS
PROGRAMMER
IMS SYSTEMS PROGRAMMER**

Your Technical expertise is needed for our conversion to VTAM.

At J I Case, a multi-plant manufacturer of heavy construction equipment, you'll be acknowledged for your programming talent in the highly specialized field of telecommunications systems. Continued growth, along with an on-going commitment to the future of teleprocessing in our operations, has created these exciting opportunities that'll make maximum use of your technical ability and career potential.

For consideration, you must have programming experience on a large IBM OS/VS system. Experience in MVS desirable, degree preferred. Present equipment offers software MVS/IMS technology and TCAM + BTAM teleprocessing with scheduled conversion to VTAM sometime next year. Hardware now in use consists of IBM 370/168 with remote terminals; 3270, 3790, 3600, 3741, and 3770.

Excellent package of compensation including top benefits package and ample opportunities for growth and professional development. Submit resume, in confidence including salary history to: Mr. C. Hartwig.

J I Case

A Tenneco Company



700 State Street
Racine, Wisconsin 53404
An Equal Opportunity Employer M/F

**NEW HAMPSHIRE
SOFTWARE
ENGINEERS**

POSITION: Will create software project from its inception through final documentation. Will also design according to customer specs., and delegate assignments to programmers.

EXPERIENCE: 4 to 5 years in software development involving PDP-11 or minicomputer systems and using ASSEMBLY or FORTRAN language.

EDUCATION: BSEE, Computer Science or Math desired.

SALARY: \$20,000-\$22,000

COMPANY: 12 years old, \$25 million annual sales.

CONTACT: Clay Hamlin

COBOL BAL PLI

**PROGRAMMERS
PROGRAMMER/ANALYSTS--ANALYSTS
SALARIES FROM \$8K-\$25K**

We currently have many positions open from Jr. Programmers through Project Leaders. Positions are available throughout New England in all phases of the Data Processing field, and in every type of company. Our staff of experienced E.D.P. recruiters is available to discuss these opportunities with you regardless of your length of experience, hardware or applications exposure. Evening appointments are available. Please call or send resume to John Carlson.

(603) 893-4511 or (617) 729-0660

CORICO CORP.

301 SO. BROADWAY
SALEM, N. H. 03079

MANAGEMENT CONSULTANTS

MASS.

**Software Development
Professionals
Get to know INTERDATA
at the
ACM Conference in Atlanta**

As a computer professional you are aware of our reputation for excellence and phenomenal growth. In Atlanta, we'd like to get to know you — the top talent in our industry. Managers of our Software Development Group will be there to describe the exceptional opportunities available to those who qualify for our highly professional team which is involved in designing the next generation of INTERDATA's software. According to your level of expertise in Software Development including Operating Systems, utilities, data communications, networks, languages, diagnostics, etc. you will lead or become a member of our professional team.

Introduce yourself to INTERDATA by visiting our Hospitality Suite at the HYATT REGENCY Atlanta in Peachtree Center and ask for Bill Beattie, or call him on our Employment Hotline — (404) 575-1760 during the Conference, any day, any hour!!

If you can't make it or call, send
your resume in strictest confidence.

INTERDATA

Subsidiary of PERKIN-ELMER
106 Apple St., Tinton Falls, New Jersey 07724

An Equal Opportunity Employer M F

Microprocessor

**Design Engineers
Applications Engineers
Sales Engineers**

Tektronix, a world leader in the electronic measurement and computer graphics markets, offers you a unique opportunity in support of a rapidly expanding microprocessor-based line.

We have immediate sales positions open throughout the U.S. and will provide you with both product and sales training.

Applicants should have a current knowledge of digital hardware design and software experience, in addition to a strong interest, aptitude, or successful experience in professional sales. A BSEE or equivalent experience in microprocessor-based systems is desirable.

In addition to a competitive salary base, sales incentive programs and automobile, we offer a comprehensive benefits program which includes medical, stock purchase, educational and retirement programs.



WESTERN U.S.

Dick Perkins
(408) 249-5500
3200 Coronado Drive
Santa Clara, California 95051

EASTERN U.S.

Steve Simms
(301) 948-7151
2 Research Court
Rockville, Maryland 20850

Or send detailed resume to appropriate address.
An Equal Opportunity Employer M/F.



TEKTRONIX
committed to
technical excellence

position announcements

position announcements

position announcements

position announcements

position announcements

LOCATE**PROGRAMMER ANALYST**

NCR Century 200. Experience preferred. Cobol and/or Neat/3 language.

Apply Personnel Dept.
Woody Laughnan
Providence Memorial Hospital
2001 N. Oregon
El Paso, Texas
(915) 542-6661

2 DESIRABLE OPENINGS AT PIZZA HUT, INC.

Pizza Hut, Inc., has grown remarkably to volume far above \$150-million. These openings offer broad scope and excellent prospects for personal progress.

SYSTEMS PROGRAMMER

The general assignment will be to implement, maintain and enhance operating systems and support software. Emphasis will be not only on meeting management needs, but also on back-up and recovery procedures to assure against serious failures; diagnostic and problem analysis, and continuing effort to improve utilization of equipment and efficiency. At least 3-5 years of pertinent experience is required with minimum of 1 year hardware/software support, in an OS or OS/VS environment. A BA in Computer Science is desirable. Salary high teens.

INTERNAL AUDITOR EDP

Able to Evaluate Adequacy of Controls Within Computer System

Responsibilities will be in the areas of evaluating policies, procedures, and systems design as they affect the security and reliability of controls built in to provide proper protection against error, interference, or abuses.

Evaluations will be performed routinely with respect to any change or addition in accounting or information systems, and audits will be done periodically or in response to specific problems. Utilize broad knowledge of EDP systems and auditing techniques to perform assignments without close supervision.

At least 5 years experience in computer systems or 3 directly in computer-based systems auditing is required, with degree in Business Administration or Computer Science. Previous audit function background in EDP systems is highly desirable.

Please send resume indicating salary record, in confidence to:

PIZZA HUT, INC.
Employment Manager
P.O. Box 428
Wichita, KS 67201
Equal Opportunity Employer

Computer Professionals

Most computer professionals are aware that today's most advanced large-system technology was developed by a company that, not too long ago, was virtually unknown. For five years the industry heard rumors of a small, crack team of computer designers in Northern California working on a new generation of high-end, high-performance computers. But, most didn't put much stock in the rumors until, in mid-1975, the first multi-million-dollar system was up and running at the first customer site.

Now the phenomenon of Amdahl is well-known in the industry. The 470V/6 performs as promised. (It is, in fact, the world's price-performance leader.) The company performs as promised. (Amdahl hardware and software support exceeds established standards.)

Consequently, by the end of 1976, over 30 systems valued at more than \$125,000,000 were operating within prestigious organizations in the U.S., Canada and Europe. Two-thirds of that 18-month installed base were shipped during the last six months of 1976.

Not widely known, however, is that this "unknown" which suddenly became a major supplier of large systems is still, in terms of staff size, a relatively small company. The kind of company, we believe, where creative, enthusiastic people like to work. It took a lot of creativity and enthusiasm (and hard work that we enjoyed because it was fun) to do what we have done. When we began, we intentionally created a friendly environment where individual efforts are recognized. We're still that way, and we need others like us to stay that way. At Amdahl, you're not lost in a sea of people: we started out 1976 with less than 400 people, and ended with less than 800. There's still room on the ground floor.

We're looking for above-average talent. You can expect an above-average compensation and benefits package. Please direct your response to Manager, Professional Employment, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, California 94086. To expedite your application, please indicate on your resume or letter the response number contained in the text of the position offering. We are, of course, an equal opportunity employer.

ENGINEERING SOFTWARE METHODOLOGY & APPLICATIONS MANAGER

You have in-depth knowledge of software tools and applications development and probably have experience with system software development. You have been looking for an opportunity to apply your talents to creating new software development methodologies, managing a group that you will structure to meet the task. Please indicate 4261-E on your response.

COMPUTER PERFORMANCE MEASUREMENT/EVALUATION MANAGER

You will lead a highly skilled group of professionals in providing performance evaluation and measurement in support of new product development. You are probably experienced with 370 architecture and performance. Please indicate 4262-E on your response.

DESIGN AUTOMATION ENGINEER

You will plan and develop an advanced DA system, responding to the technical challenges of system and logic level simulation, packaging and layout design, and fault test generation. You will interface with technology and computer development groups defining DA requirements leading to the design, specification and implementation of the total software system. You have an advanced degree in EE or computer science (or some equivalent), as well as DA-related experience. Please indicate 421-E on your response.

SOFTWARE ENGINEERING SPECIALIST

You will specify, design and develop software tools to supplement our engineering software development methodologies. You will find it helpful to be experienced with OS/JCL and PL/1. Please indicate 437-E on your response.

amdahl

LOCAL GOVERNMENT INFORMATION SYSTEMS

Positions available in systems, programming and operations.

PROGRAMMER/ANALYST with 3 or more years of experience in developing complex business oriented systems. Teleprocessing experience preferred.

PROGRAMMER DOS-VS background with minimum of 1 year COBOL. Also RPG or COBOL report writer.

CONSOLE OPERATOR DOS-VS with power. Experience required. Must be familiar with JCL and debugging abends.

Send complete resume, including salary history to:

DATA PROCESSING MANAGER
P.O. Box 306
New Haven, CT. 06502

Programmer/Analyst II

Tarrant County Junior College,
Ft. Worth, TX. Salary: \$940 per month. Two years of college and two years of experience as an application programmer required. One year of experience required with a bachelor's degree. Position available immediately. Send resume:

Director of Personnel, TCJC
1400 Electric Service Bldg.
Ft. Worth, TX 76102
336-7851

DP-NOW!

Need: Programmer/Analyst; Systems Analyst; DP Mgr; MIS Mgr for large & smaller shops. DATA BASE, MIS, Sys/3; Sys 7; Mini Computers; 360/370; All software packages; competitive salaries at all levels. Desirable locations in Mid-South, SE, SW and other areas. All fees paid by client firms; Confidential, of course! Personnel consultant for the DP professional! Nationwide recruitment and placement. Send resume to:

**RANDALL HOWARD
& Associates**
5350 Poplar #412
Memphis, TN 38117
(901) 767-5150

DATA BASE ADMINISTRATOR

Would you like the challenge of designing an IMS/DC data base for an integrated manufacturing system? Are you motivated by an opportunity to do the initial data base design for the company, establish standards, and monitor the installation of the data base as that it is done right the first time?

If the answers to these questions are an unqualified yes, and if you have previous experience designing IMS/DC data bases, you may be just the person we're looking for. The successful applicant will receive a salary of up to \$26,000 annually (based on experience and qualifications); live and work in a quiet, pleasant Iowa city; be totally responsible for the design of a large integrated manufacturing data base; and be an integral part of a multi-billion dollar international corporation.

We need you now! For immediate consideration, send your resume to:

CW Box 4880
797 Washington St.
Newton, Mass. 02160
An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

There's Still Room on the Ground Floor at Amdahl

FIELD ENGINEERS

Immediate openings throughout the U.S. and Canada. Field candidates will undergo a training period in California on full salary with housing, transportation, and other expenses provided.

You will carry the Amdahl philosophy of customer service as well as your expertise into the field, utilizing your initiative and talents to aid the customer in restoring computer center operations regardless of the origin of the failure. Large system experience essential, preferably on compatible equipment. Please indicate 560-E on your response.

FIELD ENGINEERS: TEMPORARY DUTY IN EUROPE

Immediate openings for field engineers to work at Amdahl installations in Europe as an initial assignment. You will join the permanent field engineering staff, with your first assignment being approximately six months in Europe. Same qualifications as stated elsewhere in this ad for field engineers. Please indicate 905-E/Europe on your response.

FIELD SYSTEM PROGRAMMERS

We are generating constant field openings in concert with the rate at which 470V/6 shipments are growing. We need individuals with both the attitude and aptitude to carry our enthusiasm for unparalleled software support into the field. Immediate opportunities exist throughout U.S. and Canada.

You should have a need to feel useful to Amdahl users in a mixed-vendor environment and have a propensity for exuding the Amdahl enthusiasm. You must have a firm grasp on software systems, in-depth knowledge of large system internals (OS/MVT, VM, VS2, SVS, or MVS) and excellent diagnostic ability. Please indicate 362-E on your response.

Positions offered in this advertisement represent immediate openings only. If you have any talents that you believe could be exercised in the exciting Amdahl environment, please feel free to write us.

MARKETING ANALYSTS/PLANNERS

You will become an integral part of Amdahl's market planning department in developing on-going product and marketing strategies. You will not be working in a vacuum, nor merely generating raw data, but rather playing a recognizable part in shaping future programs. You should have a college degree as well as skills in one or more of the areas below. Please indicate 373-E on your response.

Product Analysis

You will investigate, analyze and develop scenarios describing future performance levels and functions/features of competitive computer systems. Computer hardware engineering and analysis skills, and knowledge of the architecture and organization of large-scale, IBM-compatible computer systems are required. Familiarity with software aspects desirable.

Pricing, Terms & Conditions Analysis

You will monitor and analyze competitive contract terms, conditions and pricing structures, and develop appropriate scenarios. Financial and contract analysis skills required. MBA helpful.

Market Research

You will develop and coordinate on-going market research projects entailing the characteristics and attitudes of Amdahl's prospects and customers. You will also monitor, acquire and analyze research reports generated by outside vendors. Statistical analysis skills necessary.

Forecasting & Model Development

You will develop and continually define analytical models describing the important aspects of Amdahl's market situation and use these models to generate forecasts that evaluate market strategies. Operations research skills required.

Please see far left column, opposite page, for response instructions.

IMS SPECIALISTS

(Pittsburgh)

Numerous expansion related positions are available for IMS Data Base Specialists, Systems design & Program analysis of various systems applications — Banking, Manufacturing, Industrial, Corporate MIS. Salaries range to \$22,000. IBM 370/OS/VS installations. Send resume (including salary history) to RON PEARCE.

DATA PERSONNEL

414 Lawyers Building
Pittsburgh, PA 15219
(412) 261-1800

CAREER MINDED?

So are we at ROBERT HALF PERSONNEL. If you are career oriented & have expertise in any of the following areas contact us in confidence:

EDP Directors & Mgrs to \$40K
Data Base Admins & to \$30K
Analysts
Tech Serv Mgrs to \$27K
Proj Mgrs, Proj Ldrs, to \$26K
Sys/Analysts
Sys Progs & Tech to \$24K+
Specs
Mini & N/C Progs, to \$21K+
PDP, NOVA, DEC, Fortran,
ALC, Intel, etc.
Prog/Anal, Cobol to \$20K+
ALC, On-Line

**ROBERT HALF
PERSONNEL AGENCIES**
P.O. Box 19248
Greensboro, N.C. 27410
(919) 855-5992

Programmers & Analysts

Our Vice President works exclusively on placing EDP programmers, analysts & managers. Our firm has direct contact with over 1,000 EDP installations, primarily in the Southeast. Through our 175 affiliates, we have FORTUNE company clients in 35 states. Our client companies pay all fees, interview expenses & relocation costs. If you want professional representation by a firm that knows both EDP & job search and will treat your reply in absolute confidence, call ROBERT HALT-VEINSON, VP at (904) 398-7371, or send resumes to:



**EDP DIVISION
JIM KING & ASSOC.**

438 Gulf Life Tower
Jacksonville, FL 32207

Send for our new Free booklet on effective resume preparation.

Sr. Systems Programmer (IBM S/370-158)

The State University of New York at Binghamton seeks an individual with a minimum of 4 years' experience in Systems Control Program generation, modification and installation. Must be strong in OS/VS1 or MVS internals, and articulate in Assembler and PL/I. Experience in VSPC, VSAM and CM&E a plus. Minimum of a bachelor's degree in Computer Science, Natural Sciences or Mathematics required. SUNY-Binghamton is one of four university campuses in the State University of New York System. The campus of 9,300 students is located near a variety of recreational and cultural resources. A competitive salary/benefit package accompanies this position.

SUNY-Binghamton is an equal opportunity/affirmative action employer. Please send resume and salary requirements by February 15, 1977 to:

Allan R. Getman
Assoc. Director, Computer Center
SUNY-Binghamton
Binghamton, New York 13901

amdahl

SYSTEMS PROGRAMMER

An exceptional opportunity for an experienced Systems Programmer to take full responsibilities in the following areas:

- Sys Gen and Maintenance of 370/145 OS/VS1 environment
- Fine tune the operating system with our current and future business processing applications
- Perform hardware and software studies to justify changes and enhancements to our DP environment
- Participate in future planning for the next software and hardware configurations
- Develop programming procedures, standards and interface with applications programming
- Develop machine utilization techniques to measure systems efficiencies

This position is a key function within a profitable, stable organization experiencing significant growth. Our Northern New Jersey firm (five minutes from the George Washington Bridge) is the leader in its field. The benefits are excellent, and include tuition refund and profit distribution. Please send resume with salary requirements in confidence to:

CLARK O'NEILL INC.

1 Broad Avenue
Fairview, N.J. 07022
Attn: D. Bonanno

An Equal Opportunity Employer

SYSTEMS ANALYST

Requires strong technical background in 360 DOS, on-line applications, ANS COBOL, BAL. Successful applicant will be articulate, a self-starter, and a fast learner. Send resume to:

Personnel Manager

**NEW MEXICO BLUE CROSS
& BLUE SHIELD, INC.**

12800 Indian School Rd., N.E.
Albuquerque, N. Mexico 87112
An Equal Opportunity Employer

LEARN IMS

Two years or more experience in OS environment could qualify you for a growth spot in this 'State-of-the-Art' shop in the Midwest.

Call or write Jim Davis, EDP Manager.

**ROBERT HALF
PERSONNEL AGENCIES**
7733 Forsythe
St. Louis, MO 63105
(314) 727-1535

Northeast Utilities needs

TOP NOTCH COMPUTER PROFESSIONALS

Location: Central Connecticut
Hardware/Software: 370/158-168, MVS RL3.7,
3850 Mass Storage System
TCAM, CICS, TSO
Language — PL/I

If you consider yourself at the leading edge of the programming profession in a large 370 OS/VS environment, if you welcome a business environment of tough cost controls, if you enjoy a challenge and opportunity for growth, please send an up-to-date resume to Linda M. Heidenis, Employment Coordinator, Northeast Utilities, P.O. Box 270, Hartford, CT 06101. Please include salary requirements.

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Computer & Engineering Professionals

Philips Laboratories, the central research facility of the North American Philips Corporation, is looking for professionals to augment our computer system R&D staff. We have openings in the following areas:

Microcomputers

Develop operating systems and investigate the software area of mini-micro networking. Research instruction sets as related to various architectures and coding techniques. Help develop compilers. Must have Ph.D. in Computer Science with related experience.

C.A.D. Software

Develop programs in electronics, especially circuit analysis, physical modeling, and logic simulation. Handle existing programs and assist in upgrading. Research functional modeling and simulation, especially LSI sub-system design. Must have Ph.D. in C.S. with M.S. in Math, Physics, EE, and BSEE with related experience. Must be familiar with data structures, compiler techniques, language instruction; numerical analysis, differential equations, and digital electronics, as it relates to LSI.

Microprocessor

Develop programs for applications. Work on digital interfacing and hardware aspects of system. Must have BSEE with strengths in digital systems (especially computer hardware design), and Fortran, Assembler, and Machine code programming.

Systems Programming

Software programming on the SEL 32/35 mini-computer system and the IBM 370 VM/CMS. Will assist in modifying the Real Time Monitor of the SEL 32. Aid users in identifying and solving system problems. Must have B.S. in C.S. and experience in Assembler/Fortran language programming; real-time operating systems and interactive time-sharing. Competitive salary and benefits. Pleasant and attractive suburban location. Please send resume to:

Director of Personnel

Philips Laboratories

345 Scarborough Road, Briarcliff Manor, N.Y. 10510

An Equal Opportunity Employer M/F

DATA PROCESSING PROFESSIONALS

D.P. PEOPLE, INC. talks your language! D.P. Trainees, Key-punch Operators, Computer Operators, Control Personnel, Programmers, Analysts, Auditors, Supervisors, Managers - If you feel it is time for a change, give us a call and/or send us your resume. Our client companies pay our fee.

D.P. PEOPLE, INC.
Professional Personnel Agency

P.O. Box 31481
(214) 231-1984
DALLAS, TEXAS 75231

ANALYST/PROGRAMMERS NEW EDP DEPARTMENT

Salary area \$20,000
An expanding \$750 million company needs five highly promotable Analyst/Programmers for its newly established EDP department. Advancement opportunities are at a maximum. A variety of applications are involved, plus the opportunity to learn about mini computers. COBOL programming experience is required. Hardware knowledge is secondary.

For further information, contact Tom Fischer at (713) 658-9898.

All Fees Assumed
By Client Companies
M. David Lowe
Personnel Services, Inc.
430 Houston Natural Gas Bldg.
Houston, Texas 77002

COMPUTER SCIENCE

The State University College at Geneseo, New York, anticipates making a lecturer appointment in the Computer Science faculty to begin in Fall 1977. The position requires the ability to teach undergraduate courses in COBOL, FORTRAN, and applied statistics. Salary (\$12,000-\$13,000) depending on qualifications. Master's Degree required, with preference to a Ph.D. in Computer Science or related area. Appointment dependent upon budgetary approval. Send resume, transcripts, and 3 letters of reference to: Ms. Stacey Edgar, Search Committee, Computer Science, State University College, Geneseo, N.Y. 14454. Deadline for applications: March 15, 1977. Equal Opportunity/Affirmative Action Employer.

WE KNOW YOU'RE OUT THERE SOMEWHERE

We don't know who you are yet, but;

- We know you are a computer professional with in-depth programming experience using IBM operating systems, especially MVS.
- We know you have above average communication skills.
- We know you are looking for fast-paced, stimulating work that is more than just a job.
- We know you have the creativity and the imagination required to develop multi-media, individualized training.
- We know you are looking for a chance to grow; do it with a company that has been growing steadily, becoming the industry's leader.
- We know we'll find you.
- We know you'll be glad we did.

If you think the above spells your name, send your resume to the Vice-President of Product Development.



O'HARE AEROSPACE CENTER
9950 W. LAWRENCE AVE. SUITE 50
SCHILLER PARK, ILLINOIS 60176

Salary will be commensurate with your talents and experience; our pay is top for the industry.

An Equal Opportunity Employer M/F

PROGRAMMER/ANALYSTS

"IMS"

\$18-26,000

Full responsibility for detail design specifications, programming, testing and installing of new IMS applications.

1-4 years programming experience with COBOL, IMS/DATA BASE and TELEPROCESSING in a 370 IMS, DB/DC environment.

Those without IMS will be considered. Opportunities offer above average benefits, and good working environment. Extremely good advancement potential.

Various locations available.

For more information call or send resume to:

CHRISTOPHER AND LONG
ESP DIVISION

7777 Bonhomme, Suite 1801
Clayton, Missouri 63105
(314) 862-9900

EXECUTIVE DIRECTOR OF MANAGEMENT INFORMATION SERVICES

Excellent opportunity for the individual who has graduated from an accredited college or university with a combination of additional training and experience substantially equivalent to possession of an advanced degree (M.S., Ph.D.) with a major in computer science, information systems, or a closely related field; at least five years of progressively responsible experience in the administration of system development or data processing activities; knowledge of and experience with large scale computer configurations, system development techniques, and teleprocessing technology; knowledge of or experience with the information needs and processing problems of a large metropolitan school district; good oral and written communication skills.

Reporting directly to the Deputy Superintendent for Business Services, the Executive Director of Management Information Services is responsible for all information processing activities within the district. Specifically, the Executive Director's responsibilities include planning, coordinating and directing those activities related to the following functions: (1) Development, implementation and operation of all information systems; (2) Development, acquisition and installation of all computer resources; (3) Participation of the district in external projects related to information processing and/or utilization of computer resources; and (4) acquisition of resources necessary to accomplish the objectives of the district.

Dade County Public Schools have over 240,000 enrolled students and employ approximately 25,500 full and part time employees including 13,000 teachers. This position requires a genuine commitment to a high quality of public education, generative skills to release creative abilities in others proven decision-making ability to convert ideas into practice, and the initiative to see system-wide educational objectives in relation to the changing community, national and world scenes.

Salary range from \$23,570 to \$34,176. The beginning salary is negotiable. The position carries health and life insurance, retirement program and other fringe benefits.

FOR IMMEDIATE AND PROFESSIONAL ATTENTION, PLEASE DIRECT YOUR LETTER OF APPLICATION AND PERSONAL AND PROFESSIONAL RESUME TO:

Mr. Steve Moore, Assistant Superintendent for Personnel
1410 N.E. 2nd Ave., Room 100, Miami, Florida 33132

DADE COUNTY PUBLIC SCHOOLS



In accordance with both the Public Business and Public Records Laws of the State of Florida, both applications and references must be available for public inspection. Race, creed, sex, and current resident will be treated as irrelevant factors in filling this position.

An Equal Opportunity Employer M/F

Systems Programmers

Systems expansion at the Knolls

Atomic Power Laboratory creates long-term career opportunities with GE

The Knolls Atomic Power Laboratory, operated by General Electric for ERDA, currently has two CDC 6600's, one CDC 7600 and DECSYSTEM-10.

These computer systems offer skilled systems programmers the opportunity to perform a broadening array of advanced implementation tasks - either independently or with other top-level professionals. Candidates should have a BS in Computer Science, Math or related field plus a background in developing and maintaining operating systems on large scale CDC computers, including 7600/CYBER-76 and 6000/Lower CYBER computers. Knowledge of minicomputer programming and principles of computer network architecture also desirable.

Fully commensurate salaries are complemented by comprehensive GE benefits and strong potential for continuing career growth. Please send resume including salary history, to D. Bodin, Knolls Atomic Power Laboratory, General Electric, Box 1072, Schenectady, N.Y. 12301.

GENERAL ELECTRIC

An Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Technical Support Management

(To \$35,000)

Challenging career opportunity affording high growth potential with one of the largest and most highly respected international consulting firms for EDP professionals who have in-depth developmental experience in state-of-the-art concepts such as: data base management software, real time control systems, operating systems for time sharing, application software, or mini-computers. Midwest metropolitan location with approximately 20% travel. Send resume including salary history to:

P.O. Box TS A3883
Chicago, ILL 60690

M.I.S. Consultant

Denver office of International C.P.A. firm seeks an individual with 5-7 years data processing and consulting experience. Requirements include: design and implementation of large and small management information systems; experience in computer hardware and software evaluation, and knowledge of EDP performance auditing. Ability to develop new business, apply project management techniques and relate to all organizational levels is essential. Reply in confidence to: Mr. DICK DAVIES.

2100 Security Life Building, Denver, Colo. 80202
An Equal Opportunity Employer M/F

BOSTON-BASED FINANCIAL INSTITUTION OFFERS OPPORTUNITIES TO JOIN SMALL PROFESSIONAL SYSTEMS STAFF...

CORPORATE INFORMATION SYSTEMS PROGRAMMER/ANALYST Develop and implement financial and marketing information systems. This is a senior level position requiring excellent communication skills. MBA helpful.
BANKING APPLICATIONS PROGRAMMER/ANALYST Support and enhance banking applications software. Assembler, COBOL, OS/VS1 environment.
SYSTEMS PROGRAMMER Support complex environment of dual 370/145 OS/VS1, on-line communications including a national PDP network. Computer science degree or equivalent experience required.
Excellent salary and comprehensive benefit program. Please send a resume or letter including salary requirements to:

CW Box 4883
797 Washington St.
Newton, Mass. 02160

**BASIC/FOUR
MANAGER-SYSTEMS &
PROGRAMMING**

Fort Lauderdale/Miami Area

CMS, the BASIC/FOUR dealership for the State of Indiana, has acquired the dealership for the Fort Lauderdale/Miami area and needs an individual with BASIC/FOUR experience in the area of systems, programming and management to head up our staff.

Salary commensurate with experience. Reply by sending resume with salary history to:

Mr. Richard H. Cruse
COMPUTER MANAGEMENT SYSTEMS, INC.
6610 North Shadeland Avenue
Indianapolis, Ind. 46220
(317) 842-1830

**MINICOMPUTER
OPERATING SYSTEM
DESIGNERS**

We need several highly qualified people to play leading roles in the creation of a time sharing system for small business and data base management environments. Our developments employ state-of-the-art techniques, including a high level system programming language, top-down design, module decomposition based upon information hiding and the use of structured programming. A minimum of 5-8 years experience in operating system or compiler development is required plus the determination to see that things are done the right way.

IF YOU'RE THE BEST PROGRAMMER YOU KNOW, CONTACT US. IF YOU ARE THE SECOND BEST, TELL THE OTHER GUY.

Please mail resume or phone: Mr. George Mead (513) 494-5311.

**CINCINNATI
MILACRON**


PROCESS CONTROLS DIVISION
Lebanon, Ohio 45036
An Equal Opportunity Employer

**FLORIDA
DATA PROCESSING
OPPORTUNITIES**

1977 will be the best year ever for data sciences professionals in Florida and the Southeast. Some of our clients current requirements include:

S&P Managers and Leaders, Banking, Ins., and Comm — to \$32,000.
Sys. Programmers, IMS, other DB and Operating Systems — to \$28,000.
Programmer/Analysts, Man. and Comm — to \$25,000.
Banking, any application experience — to \$25,000.
Scientific, Communications, Mini-Computer Preferred — to \$22,000.
NCR Financial and On-line, COBOL and Neat-3 — to \$20,000.

For information about these and other positions, call or send a resume to:

 **LOUISE RESNICK
DATA SCIENCES
PERSONNEL, INC.**
15490 N.W. 7th Avenue
MIAMI, FLA. 33169
(305) 635-7891

SALES MGR

SERVICE BUREAU IN
BEAUTIFUL SO. CAL.
LOC. \$20 to \$40K


Opportunity for experienced professional to build a Mktg Team for established Datacenter & Mini Packages (360 Batch, Datapoint Remote Batch and Dispersed)

RAPID DATA, INC.

215 N. Fifth St.
Redlands, CA 92373
Bob Sporrang (714) 793-2855
SINCE 1962

**PROGRAMMER/
ANALYST**

Fact: Advancement comes faster with higher visibility. This growth oriented service co requires 3+ years exp IBM 370 OS or DOS COBOL. \$20,000 FEE PAID

 **ROBERT HALE
PERSONNEL AGENCIES**

522 Fifth Avenue
New York, NY 10036
(212) 221-6500

Software

Computer Associates Incorporated, one of the world's leading independent software development and marketing organizations, is seeking top computer professionals in the following areas:

Market Representatives

Our product line includes the highly successful CA-SORT system with over 1100 installations throughout the world as well as other software products for DOS, OS, VS and a full line of software for VM/370. Sales reps are needed for territories throughout the United States and Canada. Previous experience with system type packages is desirable. If you are not afraid to work and want to be well compensated for your efforts, contact us.

Technical Support

This position requires individuals who work well with people. Background to include knowledge of IBM Assembler Programming Language. Software systems experience with OS and/or DOS a definite plus. Excellent opportunity to develop with a dynamic software company and join the exciting world of software products development.

Starting salary is excellent and full insurance benefits are provided.

Please send resume to Mr. Charles B. Wang, President, Computer Associates Incorporated, 655 Madison Avenue, New York, NY 10021. Or call collect (212) 355-3333.

COMPUTER PROFESSIONALS

NCR's Terminal Systems Division in Millsboro, Delaware has immediate opportunities for programmers and systems analysts interested in joining our professional teams in the areas of engineering software development or manufacturing systems development. Some of our current opportunities include:

ENGINEERING**SOFTWARE/FIRMWARE
PROGRAMMER**

- Requires a background in minicomputer or microprocessor systems and/or associated application programming
- Knowledge of assembly language required
- Experience in Intel 8080 microprocessor beneficial

SENIOR SYSTEMS**PROGRAMMER/ENGINEER**

- Knowledge of structured programming and modular programming techniques
- Requires experience in specifying and evaluating systems architectures
- Knowledge of microprocessor hardware and software necessary as this lead position will involve communication with designers at all levels to include corporate officers

In addition to an unparalleled career opportunity with TSD-Millsboro, one visit to our scenic and uncongested coastal location will cause you to call southern Delaware home. If you're interested in personal career growth, then JOIN THE LEADER and growth with us at TSD-Millsboro. Send resume with salary history to:

Jim Spurlock, Dépt. CW-124
Terminal Systems Division - Millsboro
NCR Corporation
P.O. Box 607
Millsboro, Delaware 19966

MIS/MATERIALS**PROGRAMMER/ANALYST**

- COBOL, Assembler or NEAT/3 programming required
- Data base (particularly TOTAL) and on-line programming experience with ENVIRON/1 or Intercomm desirable
- Inventory control, WIP, MRP, and financial systems experience required

**MATERIAL CONTROL
SPECIALIST**

- Inventory control, WIP, MRP and financial systems experience in a manufacturing environment required
- Will define user specifications and interface with systems analysts to design advanced EDP systems

All positions require a BS in EE, CS or related disciplines.

NCR

An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

buy sell swap

EDP Professionals

The Jarvis Walker Groups, specialists in Data Processing Recruiting, represent client companies... in all areas of industry... across the nation. At present, extensive client needs exist at various technical levels; with particular interest in candidates experienced in the development of mini-computer systems (applications & software); & individuals with excellent project management skills in a 370/OS/VS environment. Salaries from \$16,000-\$30,000.

If you feel that your present position does not afford you the necessary career growth; please call or send letter/resume to the appropriate office & one of our associates will be happy to discuss specific client situations with you.

the jarvis walker group

N.Y. 535-5th Ave., N.Y.C. 10017
(212) 867-2650

N.J. 349 E. Northfield Rd. Livingston, N.J. 07039
(201) 994-3773

CALIF. 11222 La Cienega Blvd., Inglewood, CA. 90304
(212) 670-7353

MINI-COMPUTER SUPPORT ENGINEER

We are seeking an additional qualified professional to provide maintenance support for expanding minicomputer systems. Our equipment currently includes a PDP-15, PDP-11/40, APS-4 and APS-73 (Autologic). Two four-phase text input systems, and shortly, several PDP-11T34 systems. Applicants should have 2-3 years hands-on experience with minicomputer systems, digital equipment, and peripherals. The ability to troubleshoot from signal, logic, and circuit diagrams is necessary. An understanding of software and line protocol is desirable.

This is an ideal and promising position for the right individual to grow with data communications and distributed on-line systems. Specific knowledge of particular equipment will be gained through attendance at vendor service schools used to train their own customer engineers. Education and experience in the maintenance of DEC PDP-11 or 15 or Autologic mini-computers is a plus. No travel required other than for training.

We offer competitive salaries, excellent fringe benefits, and a professional working environment. Please send resume to:

CHEMICAL ABSTRACTS SERVICE

P.O. Box 3012
Columbus, Ohio 43210
An Affirmative Action Employer M/F

SENIOR PROGRAMMER ANALYST (CICS)

Fortune 500 company requires a professional MIS team leader for a major conversion project. This is an opportunity to participate in the initial phase of an MIS staff expansion.

The candidate must have experience in the following areas:

- Batch and on-line programming.
- Systems design.
- 370/OS applications.
- CICS-DL 1 or IMS design and implementation.
- Supervision.

Company is located in a medium size Great Lakes city known for its sport and outdoor recreation activities. Excellent compensation and benefits package.

Send resume in confidence to:

CW Box 4879
797 Washington Street
Newton, Mass. 02160

FOR SALE BURROUGHS L7000 W/L501 Console

Minicomputer with 6 Scratch Pad Memory and 3 extended memory modules with controller. 4 yrs. old in excellent condition under Burroughs maintenance. Any reasonable offer to:

Horrigan Companies
c/o James Bradley Jr.
Reading PA.
(215) 378-1867

FOR SALE 360/65 J 2860-3, 2870-1

ALL IBM MEMORY.
We will also LEASE
for 36 Month period.

Call or write
Roger J. Foti
or Bob Hogan



I.O.A. Data Corp.
383 Lafayette St., N.Y. 10003
(212) 673-9300
Member Computer Dealers Assoc.

FOR SALE

IBM SYSTEM 32

One year old, never used, warranted. Printer 100 lines/min, 9.1 MM bytes. Price/shipping terms negotiable for fast sale. Contact Steve Purser

(615) 837-8681 or
TLX 55-8423

BUY SELL SWAP

WANTED Xerox Sigma 5 Mainframes

Contact:
Paul Berneis
Comshare, Inc.
P.O. Box 1588
Ann Arbor, MI 48106
(313) 994-4800

WANTED IBM 3420 Model 6 TAPES

- 3803/2 Controller also needed
- Need prior to 02/20/77
- Will consider IBM rental credit machines being returned to IBM.

Interested sellers
please call or write

FORSYTHE McARTHUR ASSOCIATES INC.

919 N. Michigan Ave.
Chicago, IL 60611
(312) 943-3770 Telex: 25-5161

FOR SALE NEW DEC EQUIPMENT

- * 11/70 DA with 512 kb parity core
- * dual RP04 disk drives
- * dual TU16 tape drives
- * DH11 multiplexor with modem control
- * LP-11WA 300 lpm printer
- * RSTS/E license and documentation

Immediate Availability
BROOKVALE ASSOCIATES
(516) 585-0800

FOR SALE IBM UNITS

026 \$400
082 \$425
407 \$600

20 drawer IBM Card file. \$100
Remington Rand 12 drawer Kard-
veyer \$500.

Prices do not include loading or shipping.

Western Catholic Newspaper
P.O. Box 15
Springfield, IL 62705
(217) 523-4469

BUY-SELL TRADE

For Computer
Call Action Write

CAC

404/458-4425 P.O. Box 80572
Atlanta, Ga. 30365

MOVING?

Please notify *Computerworld* at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.

797 Washington Street
Newton, Massachusetts 02160

Just Out! The New

1977 Computer Salary Survey

and Career Planning Guide

Call for your FREE copy today!

Source Edp's 1977 Computer Salary Survey is now available. This authoritative and up-to-the-minute report will allow you to compare your compensation directly with professionals across the country performing the same duties you perform. It also examines in detail the strategies and techniques thousands of successful computer professionals have used to enhance their careers. After fifteen years of recruiting experience, Source Edp knows how you can gain broader professional exposure, maximize your compensation and break into management. It's all in Source Edp's 1977 Computer Salary Survey and career planning guide.

For your FREE copy, call the Source Edp office nearest you.

East		South/Southwest	
Boston	617/237-3120	Atlanta	404/325-8370
Greenwich	203/869-5977	Dallas	214/387-1600
New York/		Denver	303/773-3700
New Jersey	201/687-8700	Fort Worth	817/338-9300
Philadelphia	215/665-1717	Houston	713/626-8705
Washington, D.C.	703/790-5610	New Orleans	504/561-6000
Midwest		West Coast	
Chicago	312/782-0857	Irvine, Ca.	714/833-1730
Oak Brook, Ill.	312/986-0422	Los Angeles	213/386-5500
Cleveland	216/771-2070	Palo Alto	415/328-7155
Detroit	313/352-6520	San Francisco	415/434-2410
Kansas City, Mo.	816/474-3393	Torrance, Ca.	213/540-7500
Minneapolis	612/544-3600		
St. Louis	314/862-3800		

source edp

(When writing, please be sure to indicate home address and current position title.)

If unable to call, write:
Source Edp
Department C-3
721 Enterprise
Oak Brook, Illinois 60521

dearborn

dearborn giveth NOW 2050-H (2-chan.); 2050-1 (3-chan.); 2314/2319 (1x6); 2520-B2 punch; 2501-B2 card reader; 2671/2822 paper tape.

dearborn giveth SOON 2314-A1 (1x4) avail. 3/15/77; 2314/2319 (1x6); 2821-5 control unit; 2540; two, 1403-N1's, all avail. 4/15/77.

dearborn taketh away your 3420's and 3803's, all models. Contact Tom Millunchick... (312) 671-4410.



dearborn computer leasing company

4849 n. scott st., sculler park, IL 60176

chicago (312) 671-4410 • toronto (416) 621-7060 st. louis (314) 727-7277

CONTACT CSI

**to BUY
SELL
LEASE
TRADE**
Computer Equipment

Al Smith
6111 1960 West, Suite 202
Houston, Texas 77069
713-444-0246

Ken Steinback
11 S. Meramec, Suite 1304
Clayton, Mo. 63105
314-727-7010

Bryan G. Graham
8116 Cherington Drive
Indianapolis, Ind 46227
317-881-6766

Mike Jetland
23 Altarinda Drive, Suite B
Orinda, California 94563
415-254-3515

Bill Roselius
901 Office Park Plaza
Oklahoma City, Okla. 73105
405-840-1911

CSI
COMPUTER SALES INTERNATIONAL, INC.
Member: Computer Dealers Association



buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

PLANNING TO SEND IT BACK?

Call Us First For IBM 370 Mainframes
on MAC or T1 D - Also Buying Order Positions

CONTACT: Ted Moulder

A.M.G. EQUIPMENT SERVICES, INC.

99 Wall St. New York, N.Y. 10005
(212) 747-0670 (800) 221-2674

FOR LEASE

Available 3-1-77
370/135 GF #61928

Features:

1421, 3900, 4655,
4670, 4672, 6981,
7861, 8637

Power Unit
Console Printer

3340 - A2
3340 - B2

RALPH GRAVES
214/630-6700



Pioneer Computer Marketing
1165 Empire Central Place
Dallas, Texas 75247

360 CPU'S FOR SALE

360/30 128K 2 Channel S/N 18463
360/30 64K 2 Channel S/N 18177
360/40 256K 2 Channel S/N 22794
360/50 512K 3 Channel S/N 11031

CALL DICK BAKER (305) 561-5207

dataware
incorporated

Intracoastal Building
3000 NE 30th Place, Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207



MEMBER CDA

370/158

Buy - Sell - Lease
First Quarter Deliveries
Call Dave Tait



IPS Computer
Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs,
N.J. 07632
(201) 871-4200

IBM 148

CONFIRMED DELIVERY
SECOND QUARTER
FOR SALE

MICOM INC.

11300 N. Central 301 E. Main
Dallas, TX Barrington, IL
(214) 691-3477 (312) 382-2800

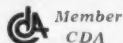
370/125's

For Sale * Lease * Purchase
* Purchase Leaseback

Specialists in 125 Systems



CORPORATE
COMPUTERS, INC.
(203) 661-1500



115 Mason St., Greenwich, CT 06830

RETURNING EQUIPMENT TO IBM?

- Please call FMA
- Your return freight bill paid by FMA
- Other incentive offered
- 3340's, 3330's, 3420's & 3277's needed

FORSYTH
McARTHUR ASSOCIATES INC

919 N. Michigan Ave.
Chicago, IL 60611
(312) 943-3770 Telex: 25-5161

FOR SALE

NCR 735
KEYTAPES

Carl Marr
EDP Corporation
219 N. Senate
Indianapolis, IN 46225
(317) 635-4310

WANTED

BURROUGHS

L3000, L5000, L8000
TC700, TC 3500

NCR

31-32-41-42-43-152

IBM

360, 370 System 3 & 32

FRIDEN

Flexowriters All models

IOA

I.O.A. Data Corp.
383 Lafayette St., N.Y. 10003
(212) 673-9300
Member Computer Dealers Assoc.

CORRECTION CORRECTION

Please Note
Correct Phone Number

FOR SALE
OR LEASE

CALCOMP

1030-230

2x12 3330

type disks

CALL

Don Weidenweber
Computer Concepts Inc.
6443 S.W. Beaverton Hwy.
Portland, Oregon 97221
(503) 297-4721 or 297-4741

FOR SALE USED DEC EQUIPMENT

- 11E05 with 16KW core mem-
ory, RK05 drive, TA-11 cassette
- 11T05 with 16KW core mem-
ory, dual RK05 drives, LA36
Decwriter and VT50 CRT
- DX11 360/370 channel inter-
face
- CR11 cpm card reader
- PC11 high spreader reader
punch

Eligible for DEC Maintenance
BROOKVALE ASSOCIATES
(516) 585-0800

BASIC FOUR MODEL 400 COMPUTER

ONE 4.2 MM DISC DRIVE
ONE 200 LPM PRINTER
16K USER CORE
TWO HAZELTINE VDT-BLACK
KEYBOARD W/BACK SPACE

REPOSSESSED FROM WHOLESALE
TOUR TRAVEL AGENCY. 3 YEARS OLD.
AVAILABLE AT ONCE. WILL SEPARATE.

\$36,000 OR BEST OFFER

HERB ARNDT (312) 869-1200
721 HOWARD ST., EVANSTON, ILLINOIS
PHONE PERSON-TO-PERSON

BUY

SELL

LEASE

Peripherals & I/O

3330's	3410's	3211's
3340's	3420's	3505's
3350's	2401's	1403's
2314's		2501's

Gene Chappell



CIS Corp.
600 Mony Plaza
Syracuse NY 13202
(315) 425-1900
Telex: 93-7435

AMERICAN USED COMPUTER CORPORATION

UNIVAC

1108 CPU

65K CORE MEMORIES

FOR 1106, 1108, 1110

TAPES, DRUMS, CTMC, etc...

9400, 9300, 9200

70/45, 494, 418

IN STOCK NOW

DATA
GENERAL 800/820

16K, 24K, 32K CPUs

Additional 4K + 8K Memory Boards

NOVA 2/10...32K...\$7,500

with Power Monitor Restart, Real Time Clock,
TTY I/O Interface, Asynchronous Multiplexor

• DCC 116

• ULTIMACC II

• NOVA 1200

• PERIPHERALS

617-261-1100



Member Computer Dealers Association

PO Box 68, Kenmore Station, Boston, MA 02215

A New Service For The Used Computer Marketplace COMPUTER EQUIPMENT INFORMATION BUREAU

FOR BUYERS: CEIB is a free, up-to-date source on current used equipment offerings that's as close as your telephone. Our equipment file includes over 5685 current listings from numerous brokers, dealers, and private sellers. Just call (617) 247-2290 to obtain immediate information on any specific systems or items you're interested in - including seller's names, asking prices, and availability dates.

FOR SELLERS: CEIB is an inexpensive, convenient approach to reaching potential buyers. If you haven't already received our brochure and listing forms, please write or call -

CEIB - P.O. Box 163; Boston, MA 02117 - (617) 247-2290
R. Ferrara, President

370/158

SHORT TERM
LEASE AVAILABLE

Contact T.J. McArdle-President

NATIONAL COMPUTER RENTAL LTD.

415 Madison Ave. N.Y. 10017
(212) 532-1500

SELL : LSI 11

components and systems custom hardware and software

8K RAM

5 inch wide module . . . \$750

100 PLUS Corporation
701 Trinity St.
So. Plainfield, N.J. 07080
(201) 753-4460

LOOK!

WANT TO PURCHASE
370/360 Peripheral Equipment
3330-3340-3803-3420-1403N1
Will Consider Your Purchase Options
We Are the Texas Good Guys With
the White Hats



DATA AUTOMATION COMPANY, INC.
4858 Cash Road, Dallas, TX 75247
(214) 637-6570



buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

FOR SALE

Immediately Available
370/135-GF
#61485

IFA — 3330
 IPA
 1st Sel. Channel
 1st Inc. Control Storage
 UCS with
 3215 & 3046

Also Have Available
370/138 & 148
 (on/order positions)

RALPH GRAVES
214/630-6700



Pioneer Computer Marketing
 1165 Empire Central Place
 Dallas, Texas 75247

360/65J

S/N 60773
 Sale or Lease
 Available February 5
 With 2860-3 & 2870-1

Call Dick Absher



IPS Computer
 Marketing Corp.
 467 Sylvan Ave.
 Englewood Cliffs,
 N.J. 07632
 (201) 871-4200

CMI BUY LINES

370
115-125-135
 Buy-Sell-
 Lease-Trade

Call Mike Vargo
 (313) 774-9500

Nation's
 Leader In Small
 Systems

360/20

Call Bob Southwell
 (313) 774-9500

S/3
 Components &
 Systems

Call Jerry Roberts
 (313) 774-9500

1130

Call Jim Carleton
 (313) 774-9500

3270 CRT'S

For Sale or Lease
 We Want to Buy
 CRT's, Printers & Controllers
 Call Bill Graham
 (313) 774-9500

360/50

360/40

360/30

We Buy and Sell Any 360 System
 or Peripherals. Before you buy or
 sell, get your most competitive
 offer from CMI.

Call Bob Van Hellemont
 (313) 774-9500

3420's 3803's
3333's 3830's
3330's

SALE OR LEASE
ALL MODELS

Call Darryl Hastings
 (313) 774-9500

370/145-158
BUY-SELL-LEASE

Call Ron Baker
 (313) 774-9500

IBM 129 Users

We Want to Buy Rental
 Credit Machines
 Lease Back
 Plans Available

BUY-SELL-LEASE

129 029 059 026

IBM Manufactured
082 083 514

Call Jim Carleton
 (313) 774-9500

IN CANADA

IBM 360 370
 System/3

Buy-Sell-Lease

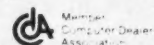
Call Don DuPuis
 CMI Company
 P.O. Box 893
 Windsor, Ont. n9A6P2
 (519) 258-8910

CMI Computer Marketers International

23000 Mack Ave., St. Clair Shores, Mi. 48080

313/774-9500

THE IBM DEALER



3420-6 Tape System

Sale or Lease
 2 Controller &
 14 Drive System
 6250/1600 BPI
 2 X 16 Switch
 2 Channel Switch
 Available February 1
 Call Ed Joseph



IPS Computer
 Marketing Corp.
 467 Sylvan Ave.
 Englewood Cliffs,
 N.J. 07632
 (201) 871-4200

FOR SALE
DATA GENERAL

Jumbo 800 with 24K
 (3) 2.5 M Byte Disks
 25M Byte Disk
 9 Track Mag Tape
 245 LPM Line Prtr 132 Col
 TTY, CRT, Dataphone Interfaces
 Card Reader, Real-Time Clock
 Center for Lab Medicine
 16 Pearl St.
 Methuchen, N.J.
 Dr. Glenn Fellows
 (617) 486-8938

FOR SALE
BEST OFFER BASIS
BOTH ITEMS
NEVER USED

Tektronic Disc Memory Model
 4922, dual drive, 252 byte capa-
 city, cost \$6410.
 IBM Input/Output Model 735
 Writer Cost \$1,790.
 Contact: J. Burdon, Inc., P.O.
 Box 38, Wallingford, CT 06492
 (203) 269-7745.

ENTREPRENEURS

COMPUTER SHACK

Personal computers are the world's newest, most exciting and the
 fastest-growing business. Computer Shack, our turn-key computer
 franchise network, lets you get in at the ground floor. Unlimited
 potential. Complete training program.

Personal microcomputers are sold to business, science, education, the
 professions, as well as the explosively growing hobbyist market.
 Computer Shacks offer microcomputers, modules, tools, books, acces-
 sories; provide equipment assembly and testing. Each store has a
 traffic-building Game Room. Choice locations available.

Call or write:
 Ed Faber, President

Computer Shack, Inc.
 14860 Wicks Blvd.
 San Leandro, CA 94577
 (415) 895-9363

Want to Buy

IBM
7000
 Series Computers

We will take
 any type of 7000
 in virtually any
 condition. Contact
 Bill Pomeroy



CIS USA CIS Europe, SA
 600 Mony Plaza 80 Chaussee De
 Syracuse, NY Charleroi
 13202 1060 Brussels,
 (315) 425-1900 Belgium
 Telex: 93-7435 Tel: 538-90-93
 Telex: 26025

FOR SALE OR LEASE - 360/20

2020	DO2	Central Processor	30692
	7495	Storage Control	
	8082	2203 Attachment	
	8099	2560 Attachment	
2203	A01	350 LPM Printer	20090
	5558	24 Additional Print Positions	
	1903	52 Additional Print Positions	
2560	A01	M F C M	10437
2311	011	Disk Drives	17785
2311	011	Disk Drives	30383

Located: Portland, Oregon Available: January 10, 1977
 Maintenance Qualification: IBM Qualified

Call or Write:



Data Automation Co., Inc., P.O. Box 47922
 Dallas, Texas 75247 - Phone (214) 637-6570
 We would like to be your Computer Company.

ITEL WANTS TO

BUY: 370/158

SELL: 360/50I, 40H, 40G, 30F, 30E
 1/2 360/65 MP
 135 IBM Memory (96K-192K)
 ITEL 2314 Dual Density Disk Drives
 2841's, 2314-A1's
 2401's — all models

CONTACT: Linda Vaughn or Reenie McCarthy
 ITEL Computer Products Division
 One Embarcadero Center
 San Francisco, California 94111
 (415) 983-0220, (415) 983-0238

Elsaph Arden
 ITEL International
 London, England
 (441) 235-2495

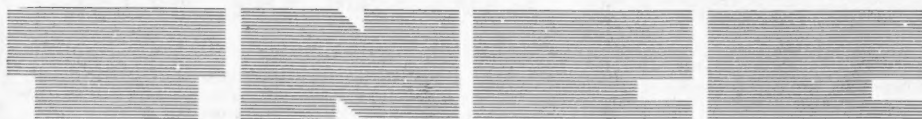
ITEL
 CORPORATION

3158
AVAILABLE
MARCH, 1977
FOR LEASE
2 YEAR TERM

3155-II DAT
SALE OR LEASE

WANTED TO BUY
RENTAL CREDIT

3158



THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle — (312) 944-1401
 600 North McClurg Court - Suite 4202A
 Chicago, Illinois 60611

Paul Nortman — (516) 752-1000
 1 Huntington Quadrangle - Suite 4S13
 Huntington Station, New York 11746

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
COMDISCO COMDISCO The World's Largest IBM Computer Dealer		370/155 DAT S/N 10463 Sale or Lease Available for Immediate Delivery With or Without Memory Call Ted Molinari  IPS Computer Marketing Corp. 467 Sylvan Ave. Englewood Cliffs, N.J. 07632 (201) 871-4200	 BUYING SELLING LEASING 360/40 370/145 370/135 360/50 370/158 370/155 360/65 370/168 370/165 TAPES/DISKS/CORE Pioneer Computer Marketing 1165 Empire Central Place Dallas, Texas 75247 214/630-6700	
SELLING 3145 3158 3165 LEASING 3158K 3168KJ 3165J2 BUYING 3165-2 DAT - 60 month lease 3155-2 DAT - 48 month lease WRITE: Comdisco, Inc. 9701 W. Higgins Rd. Rosemont, IL 60018 CALL: (312) 698-3000 East: (201) 568-9666 West: (415) 944-1111 TWX 910-253-1233 Member Computer Dealers Association		FORSYTHE McARTHUR ASSOCIATES INC  919 North Michigan Avenue, Chicago, Illinois 60611 312-943-3770 Telex 255161 Member, Computer Dealers Association		

FOR SALE REI Document Scanner and Page Reader - Reads up to 1200 documents/minute - Full System - 4 Tape units, 3-9 Track, 1-7 Track - Printer 1100 LPM - Reads: 1403, OCR-A Fonts, E13B, Farrington 7B Available second quarter 1977 Contact: James S. Walker Provident National Bank 120 S. 17th Street Philadelphia, PA 19103 (215) 585-5432	JAMES COMPUTER CO. BUY/SELL/LEASE/TRADE SPECIAL SALE IBM UNIT RECORD EQUIP. We Buy Rental Credit Equip. IBM 029's & 129's - All models Your source for guaranteed equipment James Computer Co. 4970 Marine Drive / Chicago, Illinois 60640 Natalie Reyes (312) 271-3311 (312) 728-6871	WANTED 3420's 3803's 3333's 3830's 3330's PCM will purchase your installed disk's or tapes that have maximum rental credits 214/630-6700  Pioneer Computer Marketing 1165 Empire Central Place Dallas, Texas 75247	DEC (3) RP03s with controller (2) TU10s with controller contact: Dick Broadbent (606) 278-0411	FOR SALE DEC EQUIPMENT • 340 system w/2-VTO5's • 330 system w/2-VTO5's • 310 system • Additional VTO5's • Centronics 101 printer  CrossComp Computer Systems 3824 50th Street Lubbock, Texas 79413 (806) 792-3785
---	---	---	--	---

IBM UNIT RECORD EQUIPMENT 024 077 085 402 514 552 026 082 087 403 519 557 029 083 088 407 523 602 056 084 089 408 548 604 029 129 We Buy Sell or Lease 360s 1400s 1440s IBM COMPUTERS 2040 GF, I/O Set 5 Spindle Calcomp 2314 6-60KB Tape Drives/Sims Big Savings — up to 50% on Short Term Rentals Call us for all your needs; we buy rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. All equipment rebuilt at our own factory and guaranteed for IBM Maintenance. Contact ACS for proposal.  7126 Mullins Houston TX 77036 (713) 666-2122 TWX 910-881-1526 EQUIPMENT CORP.	FOR SALE UNIVAC PERIPHERALS 1-5024-II Disk Control Unit with 8 Drive Capacity and Channel Parity Checking Feature. 4-8414 Disk Drives. All units are under UNIVAC Maintenance and will be available for Sale in late 1st quarter 1977. CW Box 4881 797 Washington St. Newton, Mass. 02160	THE PRICE IS RIGHT! FOR SALE-360/40 <table border="1"> <thead> <tr> <th>TYPE</th> <th>MODEL OR FEATURE NO.</th> <th>DESCRIPTION</th> <th>SERIAL NO.</th> </tr> </thead> <tbody> <tr> <td>2040</td> <td>GOO 3237 3274 4457 4460 6980 6981 7520 7920</td> <td>Central Processor Decimal Arithmetic Direct Control 1401/1440/1460 Compat. 1401/1440/1460 DOS Compat. Selector Channel 1st Selector Channel 2nd Storage Protection 1052 Attachment</td> <td>22067</td> </tr> <tr> <td>1052</td> <td>007</td> <td>Typewriter Keyboard</td> <td>59225</td> </tr> </tbody> </table> Located at Comma Corp. - Dallas Texas Available Immediately Maintenance Qualifications: IBM Qualified  Data Automation Company, Inc. 4858 Cash Road, Dallas, TX 75247 (214) 637-6570	TYPE	MODEL OR FEATURE NO.	DESCRIPTION	SERIAL NO.	2040	GOO 3237 3274 4457 4460 6980 6981 7520 7920	Central Processor Decimal Arithmetic Direct Control 1401/1440/1460 Compat. 1401/1440/1460 DOS Compat. Selector Channel 1st Selector Channel 2nd Storage Protection 1052 Attachment	22067	1052	007	Typewriter Keyboard	59225
TYPE	MODEL OR FEATURE NO.	DESCRIPTION	SERIAL NO.											
2040	GOO 3237 3274 4457 4460 6980 6981 7520 7920	Central Processor Decimal Arithmetic Direct Control 1401/1440/1460 Compat. 1401/1440/1460 DOS Compat. Selector Channel 1st Selector Channel 2nd Storage Protection 1052 Attachment	22067											
1052	007	Typewriter Keyboard	59225											

FOR SALE OR LEASE IBM Sys/3 Mod 10-Disk 5410-A14 16K CPU 3971 PRT Attach 4100 MFCU Attach 4110 PRT Kbd Attach 4203-2 200LPM PRT 5560 132 PRT Pos 5424-1 MFCU 250/60/60 5444-2 4.9 M Disk 5471-1 PRT Keyboard SHARED MANAGEMENT, INC. 76 Pratt Johnson City, N.Y. (607) 798-7805	FOR SALE BURROUGHS B3500 120 KB Core Memory 800 lpm Line Printer (2) 800 BPI-9-Tr Tapes 800 CPM Card Reader 20M Bytes Disk (20 ms) Ernie Lucken Diversified Computer Applications 2525 E. Bayshore Road Palo Alto, Calif. 94303 (415) 324-2523	IBM 3288 PRINTERS AVAILABLE • 120 LPM Printer for 3270 System • Delivery Immediate • 3 and 4 Year Leases CALL TERMINAL LEASING CO. A Partnership between Comdisco, Inc. (312) 698-3000 and Forsythe/McArthur Associates, Inc. (312) 943-3770 "3270 Leasing is Our Business"	DEC OEM's & End Users C.D. SMITH Broker In New & Used DEC Data Systems 310 & 350 Series Available 4151 Southwest Freeway Suite #130 Houston, Texas 77027 (713) 965-0874
--	---	---	---

370/138's AND 148's AN IBM MLC ALTERNATIVE ANICO COMPUTER LEASING, INC. now offers the true 48 month lease alternative to IBM MLC. Early terminations and upgrade flexibilities. Delivery positions available or will take your order position. Our rate 80% of MLC Excellent alternatives on most 370 equipment from IBM 370/135 and up, especially 370/158, any model. Most Competitive Financial Leasing on: IBM Series/1 ITTEL Advanced Systems AMDAHL 470 Versions CONTACT: Amado E. Hernandez, President ANICO COMPUTER LEASING, INC. a wholly owned Subsidiary of Analysis International Co., Inc. 4530 PARK ROAD CHARLOTTE, N.C. 28209 704/523-6912 MEMBER COMPUTER LESSORS ASSOCIATION	Arapahoe County School District No. 6 is ACCEPTING BIDS for the sale of: Univac 9300 32K Disc System with DCS-4 Communications Sub-System, (2) Communications Lines, 600 cpm reader, 600 lpm printer, Selector Chnl, Multiplexor I/O Chnl, Disc File Control, (2) 8414 Drives, (21) Memorex Mark VI Disc Packs. Bid Opening Date: March 18, 1977. For further information and/or Bid Forms please contact: Jim Hannasch, Director of DP 5793 South Prince St. Littleton, Colo. 80120 (303) 798-2501, Ext. 38	GO GREYHOUND  WHEN BUYING OR SELLING COMPUTER EQUIPMENT <table border="1"> <thead> <tr> <th>FOR SALE</th> <th>Available Now 2-3330-1's 2803-2 & 2420-7's</th> <th>Available Jan. 370/155J With AMS Memory & PSU</th> </tr> </thead> <tbody> <tr> <td>U.S.</td> <td>Home Office New York Chicago Dallas San Francisco</td> <td>T.A. Takash Dick Ventola Pete Ahern M.W. "Bill" Tucker Henry Paulson</td> </tr> <tr> <td>Canada</td> <td>Don Maunder (Toronto)</td> <td>(416) 366-1513</td> </tr> <tr> <td>U.K.</td> <td>Bruce Pearson (London)</td> <td>(01) 759-9191</td> </tr> <tr> <td>Europe</td> <td>Joe Gold (Geneva)</td> <td>(022) 61-27-54</td> </tr> <tr> <td>Mexico</td> <td>Andres Contreras</td> <td>(905) 543-6850</td> </tr> <tr> <td>Austro-Asia</td> <td>Don Haworth</td> <td>(214) 233-1818</td> </tr> <tr> <td>Non-IBM</td> <td>Dallas</td> <td>John Hallmark</td> </tr> <tr> <td></td> <td></td> <td>(214) 233-1818</td> </tr> </tbody> </table> Greyhound Computer Corporation Greyhound Tower Phoenix, Arizona 85077	FOR SALE	Available Now 2-3330-1's 2803-2 & 2420-7's	Available Jan. 370/155J With AMS Memory & PSU	U.S.	Home Office New York Chicago Dallas San Francisco	T.A. Takash Dick Ventola Pete Ahern M.W. "Bill" Tucker Henry Paulson	Canada	Don Maunder (Toronto)	(416) 366-1513	U.K.	Bruce Pearson (London)	(01) 759-9191	Europe	Joe Gold (Geneva)	(022) 61-27-54	Mexico	Andres Contreras	(905) 543-6850	Austro-Asia	Don Haworth	(214) 233-1818	Non-IBM	Dallas	John Hallmark			(214) 233-1818
FOR SALE	Available Now 2-3330-1's 2803-2 & 2420-7's	Available Jan. 370/155J With AMS Memory & PSU																											
U.S.	Home Office New York Chicago Dallas San Francisco	T.A. Takash Dick Ventola Pete Ahern M.W. "Bill" Tucker Henry Paulson																											
Canada	Don Maunder (Toronto)	(416) 366-1513																											
U.K.	Bruce Pearson (London)	(01) 759-9191																											
Europe	Joe Gold (Geneva)	(022) 61-27-54																											
Mexico	Andres Contreras	(905) 543-6850																											
Austro-Asia	Don Haworth	(214) 233-1818																											
Non-IBM	Dallas	John Hallmark																											
		(214) 233-1818																											

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Before you buy or lease... take a second look

**BUY-SELL-LEASE**

360/30 — 360/40 — 360/50 — 360/65

IBM PERIPHERALS

370/135	370/145	370/155	370/165
370/138	370/148	370/158	370/168

ANY CONFIGURATION

3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO — 312/295-2030
WASHINGTON — 202/466-2470
LOS ANGELES — 213/370-4844

IBM EQUIPMENT FOR LEASE

024	\$10/Month
026	\$30/Month
077	\$15/Month
082	\$25/Month
083	\$55/Month
088-1	\$150/Month
088-2	\$100/Month
402	\$25/Month
403	\$30/Month
407	\$40/Month
419	\$25/Month
514	\$35/Month
519	\$50/Month
526	\$60/Month
548	\$75/Month
552	\$45/Month
557	\$100/Month

1401-CO6 System Complete with
Tapes & Disks \$1,000/Month.
7330 Tape Drives \$25/Month

Data Automation Co. Inc.
4858 Cash Road
Dallas, TX 75247
(214) 637-6570

MINI COMPUTERS

Buying, Selling? Let us do the
work for you and save you time
and money!

AVAILABLE NOW:

Novas — most models — new &
used; DEC 11s & 8s; Printers, disc
drives; CRTs, etc.

WANTED

DEC & DGC Systems, CPUs &
peripherals.
Buyers waiting for 8Es & 8Ms.

MINI COMPUTER EXCHANGE

(408) 733-4400
TWX 910-339-9272



JAN GEDDES'

sale of the week**SPECIAL CASH SALE on ASR33 TELETYPES**

Fully reconditioned
90 day warranty
Mod. kits available
for DEC and Data General

\$850.00
for cash with P.O.
Our standard low price—
\$975.00

NEWMAN COMPUTER EXCHANGE
1250 N. Main St. Ann Arbor, MI. 48104
(313) 994-3200

BUYING**N.C.R. PHASE-OUT EQUIPMENT—31, 32 and 441's**

41, 42 and 43 BANK MACHINES AS WELL AS 151 and
152 ADDING MACHINES. ALSO 299 and 399 MINICOMPUTERS
BURROUGHS F-5000/6000 SERIES, L SERIES and 10-10-380 & 10-10-360
TELLER MODELS. FRIDEN 5005 COMPUTYPER

Also A Supplier of SELECT-USED Equipment From: BURROUGHS • I.B.M. • PHILIPS

BUYING OR SELLING—CALL US FIRST!

**KEY-EXIMPORT CORP.**

256 LIVINGSTON ST. (P.O. BOX 129) NORTHVALE, N.J. 07647
TELEX: 135149 CABLE: KEYEXIMP-NORTHVALE NJ

TELE. N.J.
(201) 767-3444
N.Y.C. DIRECT LINE
(212) 736-7736

FOR LEASE**IBM 370/135 DH**

Available March, 1977 for any
term up to 40 months.

Includes 3215, 3046 and features
3274, 3900, 4640, 4722, 6981,
6982, 7861, 7855.

CONTACT

J.E. Nevens
Brenco Automation Center, Inc.
2222 Grand Avenue
Des Moines, Iowa 50312
(515) 283-2415

FOR SALE

Immediate Delivery
Available

Basic Four Model 400

48K, 3 Disk Drives
3 CRT's
3 Printers
(212) 541-8454
John Watson

BUY/SELL/LEASE/TRADE

IBM 360s, 370s, System 3s, all Peripherals
3830s, 3333s, 3330s, 3420s, 3803s

Purchase/Leaseback Machines Wanted

All types 1400 Series; 1130s, 1620s

Unit Record Equipment Refurbished — All Models

Disk Packs — recertified, initialized

Call collect today (214) 634-2750

METROPLEX COMPUTER COMPANY, INC.
Suite 1208 Honeywell Bldg. 1111 W. Mockingbird Lane
Dallas, Texas 75247 TWX 910-861-4171

INDUSTRIAL CONTROL COMPUTER WITH FREE EDP SOFTWARE

Optimum Configuration For:

- Message Switching
- Process Control
- Numerical Control

DEC PDP-11/40
PDP 11/34 Equiv.

Immediate Delivery
If you can act fast

Contact: Pete Melvin
At 890-9393

460 Totten Pond Road,
Waltham, MA 02154

INTELLIGENT SYSTEMS

(617) 890-9393

370/145-I2

S/N 11400

Sale or Lease

Available February 1
With ISC

Call Rick Thiele



IPS Computer
Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs,
N.J. 07632
(201) 871-4200

BUY • SELL • LEASE

370/125
370/115



ECONOMIC COMPUTER SALES, INC.
1255 Lynnfield Road PO Box 17825
Memphis, Tenn. 38117 (901) 767-9130
TWX 810-591-1205

MEMBER COMPUTER
DEALERS ASSOCIATION

FOR SALE OR LEASE

I/O SET
with two 1403N1
printers

Contact: Harry Blair
Computer Installations Corp.
(713) 524-1401

BUY — SELL — LEASE — BROKERAGE —

Let the
"Nation's Largest Wholesale Dealer"
Buy, sell, lease sub-lease, or be
your agent in placement of your
pre-owned IBM 360/370/System
3, or other units

COMPUTER INTERNAT'L LTD
BEACH COMPUTER CORP.
CWC's Leasing Division
COMPUTER WHOLESALE CORP.
(504) 581-7741

Suite 507/508 First National
Bank of Commerce Bldg.
New Orleans, LA 70112
Member Computer Dealers Assoc.

IBM UNIT RECORD EQUIPMENT

MACH.	SALE	LEASE	MACH.	SALE	LEASE	MACH.	SALE	LEASE
024	\$250	\$17/Mo.	082	\$850	\$35/Mo.	514	\$600	\$45/Mo.
026	\$800	\$30/Mo.	083	\$1850	\$60/Mo.	519	\$900	\$55/Mo.
029	\$1900	\$50/Mo.	084	\$2300	\$100/Mo.	526	\$1400	\$70/Mo.
046	\$1200	\$50/Mo.	085	\$1100	\$60/Mo.	548	\$1600	\$70/Mo.
047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	552	\$1000	\$40/Mo.
056	\$175	\$15/Mo.	089	\$1300	\$50/Mo.	557	\$3000	\$100/Mo.
059	\$1800	\$50/Mo.	402	\$800	\$60/Mo.	602	\$300	\$20/Mo.
063	\$750	\$30/Mo.	403	\$900	\$70/Mo.	2311	\$450	\$30/Mo.
077	\$350	\$25/Mo.	407	\$1200	\$80/Mo.	1401	\$10500	\$400/Mo.

THOMAS COMPUTER CORPORATION

600 N. McClurg Court - Suite 4202
Chicago, Illinois 60611
(312) 944-1401

Now Randolph has 2 hot lines!

The S/370 hot line.
800-243-5307

The S/360 hot line.
800-243-5308

WE WANT TO BUY

- 138/148 on-order positions
- 135/145 subleases

RANDOLPH COMPUTER COMPANY

WE WANT TO BUY

- 3420-3's
- 3420-5's

537 Stamford Road Greenwich, Connecticut 06830

buy sell swap	buy sell swap	buy sell swap	buy sell swap	time & services																																												
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p>Call us "Doc" (Data Options Corporation)</p> <p>We have the prescription for all your IBM computer hardware needs.</p> <ol style="list-style-type: none"> 1. We are specialists in brokering leases and sub-leases. 2. We will lease or sub-lease your IBM 370 for 6 months to 7 years or fill your EQUIPMENT NEEDS on a lease or sub-lease basis and sale or purchase. 3. We will buy your 138/148 delivery position. <div style="border: 1px solid black; padding: 5px;"> <p>a. Avail Now: 3158 1 & 2 megs (can upgrade) b. For Lease: 148 (no penalty out), 145/135/125. c. Need all 370s for sublease</p> </div> <div style="display: flex; align-items: center;"> <div style="margin-left: 5px;"> <p>DATA OPTIONS CORPORATION</p> <p>Call Us! (914) 723-3800 Station Plaza 250 E. Hartsdale Ave. Hartsdale, N.Y. 10530</p> </div> </div> </div> <div style="width: 20%;"> <p>FOR SALE</p> <p>IBM 3360-3 (155 Core) L-512K</p> <p><i>Immediate Delivery</i></p> <p>Write CW Box 4886 797 Washington St. Newton, Mass. 02160</p> </div> <div style="width: 20%;"> <p>FOR SALE</p> <p>IBM UNIT RECORD EQUIPMENT</p> <table border="0"> <tr><td>024</td><td>\$175</td></tr> <tr><td>026</td><td>\$750</td></tr> <tr><td>047</td><td>\$850</td></tr> <tr><td>056</td><td>\$50</td></tr> <tr><td>059</td><td>\$1,650</td></tr> <tr><td>077</td><td>\$100</td></tr> <tr><td>082</td><td>\$650</td></tr> <tr><td>083</td><td>\$1,650</td></tr> <tr><td>084</td><td>\$2,250</td></tr> <tr><td>084 Alpha</td><td>\$3,250</td></tr> <tr><td>085</td><td>\$475</td></tr> <tr><td>088-2</td><td>\$1,700</td></tr> <tr><td>088-1</td><td>\$2,475</td></tr> <tr><td>108</td><td>\$990</td></tr> <tr><td>402</td><td>\$300</td></tr> <tr><td>403</td><td>\$500</td></tr> <tr><td>514</td><td>\$250</td></tr> <tr><td>519</td><td>\$750</td></tr> <tr><td>526</td><td>\$900</td></tr> <tr><td>548</td><td>\$1,650</td></tr> <tr><td>552</td><td>\$1,000</td></tr> <tr><td>557</td><td>\$2,250</td></tr> </table> <p> Data Automation Co. Inc. 4858 Cash Road Dallas, TX 75247 (214) 637-6570</p> </div> <div style="width: 20%;"> <p>Prime Time Available</p> <p>360/50 - 256K</p> <p>5/2314 - 4/180KB</p> <p>Call: (212) 725-5775 Infologic 444 Park Ave. So. (30St) New York 10016</p> </div> </div>					024	\$175	026	\$750	047	\$850	056	\$50	059	\$1,650	077	\$100	082	\$650	083	\$1,650	084	\$2,250	084 Alpha	\$3,250	085	\$475	088-2	\$1,700	088-1	\$2,475	108	\$990	402	\$300	403	\$500	514	\$250	519	\$750	526	\$900	548	\$1,650	552	\$1,000	557	\$2,250
024	\$175																																															
026	\$750																																															
047	\$850																																															
056	\$50																																															
059	\$1,650																																															
077	\$100																																															
082	\$650																																															
083	\$1,650																																															
084	\$2,250																																															
084 Alpha	\$3,250																																															
085	\$475																																															
088-2	\$1,700																																															
088-1	\$2,475																																															
108	\$990																																															
402	\$300																																															
403	\$500																																															
514	\$250																																															
519	\$750																																															
526	\$900																																															
548	\$1,650																																															
552	\$1,000																																															
557	\$2,250																																															
<p>FOR SALE</p> <p>Communication Terminals</p> <ul style="list-style-type: none"> • Teletypes - 28 32 33 35 • TWX - TELEX • DECwriters LA36 • Acoustic Couplers • & Hardware Modems <p>DATA COMMUNICATION EQUIPMENT BROKERS, INC. 1878 Thunderbird Street Troy, Michigan 48064 (313) 362-0470</p>	<p>360/40 System</p> <p>Sale or Lease With Full I/O Set Tape & Disk Drives</p> <p>Call Jeff Klein</p> <p> IPS Computer Marketing Corp. 467 Sylvan Ave. Englewood Cliffs, N.J. 07632 (201) 871-4200</p>	<p>MAGNETIC TAPE FOR SALE!!</p> <p>Recertified 100% Guaranteed Trouble Free</p> <p>1600 BPI 2400 feet 3200 FCI 9 track - \$5.47</p> <p>800 BPI 2400 feet full width tested - \$4.97</p> <p><i>Seals or thin line containers</i></p> <p>Call Joann (703) 339-7050</p> <p> Precision Methods Inc. 8825 Telegraph Road Lorton, Virginia 22079</p>	<p>CONFIDENTIAL BOX SERVICE</p> <p>FOR ADVERTISERS who do not wish their names or addresses to appear in their ads, <i>Computerworld</i> offers a confidential box service. To take advantage of this service, simply state in your initial order that you would like a "blind" ad. <i>Computerworld</i> will then assign your ad a box number and forward all replies. The cost for this extra service is only \$1 per ad per insertion, no matter how many replies are received.</p>	<p>Datacenter 370/158</p> <p>3 meg VS2 Specializing in Remote Job Entry and Batch</p> <p>Excellent Technical Support Very Attractive Rates</p> <p>Contact: Stu Kerievsky (212) 564-3030 Datamor 132 W. 31st St. New York, N.Y. 10001</p>																																												
<p>WANTED</p> <p>ALL 360 AND 370 SYSTEMS AND PERIPHERALS</p> <p>WE BUY • SELL • LEASE • TRADE</p> <p> transdata</p> <p>P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647</p>																																																
<p>FOR SALE</p> <p>EASY LOAD 1 CARTRIDGES (slightly used-new style-white) \$.90 each</p> <p>EASY LOAD 1 CARTRIDGES (grey color-Memorex-used) \$.70 each</p> <p>MMI will pay freight on orders of 1000 or more.</p> <p>Call Collect: Bill Lissau or Warren Todd Magnetic Media, Inc. Tulsa, Oklahoma (918) 664-2255</p>	<p>SYSTEM/3</p> <p>1130 360/20</p> <p>BUY • SELL • LEASE</p> <p>For a prompt, competitive quotation on your IBM needs, call or write today.</p> <p><i>"The Small Systems Specialists"</i></p> <p> ECONOCOM</p> <p>ECONOMIC COMPUTER SALES, INC. 1255 Lynnfield Road P.O. Box 17825 Memphis, Tenn. 38117 (901) 767-9130 TWX 810-591-1205</p> <p> Member Computer Dealers Association</p>	<p>TELETYPE</p> <p>Models 32-33 New, Used Telex • TWX/DDD BRPE'S</p> <p>NATIONAL TELETYPEWRITER CORP. 207 Newtown Rd. Plainview, N.Y. 11803 (516) 293-0444</p>	<p>TIME & SERVICES</p>	<p>SOFTWARE WANTED</p>																																												
<p>FOR SALE</p> <p>DEC TSS/8 TIME SHARING COMPUTER INCLUDING BUSINESS PROGRAMS AND CUSTOMER BASE</p> <ul style="list-style-type: none"> • 4 Tape Drives • 2 RS08 Disk Files • 10 MM Char. Memorex Disk Drive • 4 Multiplexers • 16 Modems • 16 Ports <p>TRANSNET CORPORATION 2005 Route 22 Union, N.J. 07083 (201) 688-7800</p>	<p>BUY OR SELL</p> <p>COMPUTER/COMMUNICATION EQUIPMENT</p> <p>NEW IN-HOUSE "DEAL COMPUTER"</p> <ul style="list-style-type: none"> • WE ACCEPT YOUR CONSIGNMENT INVENTORY • WE MATCH BUYER & SELLER • WE HANDLE THE TRANSACTION FOR YOU • WE WILL BUY YOUR INVENTORY OUTRIGHT • ALL LISTINGS ARE FREE! <p>GET COMPLETE DETAILS WITH A DIRECT CALL 800 527-2548 • 214 255-2414 TWX 910-860-5781 • TELEX 73-0022</p> <p> capital equipment brokers 930 N. BELTUNE • IRVING, TEXAS 75061</p>	<p>I.B.M. 360-40</p> <p>All Shifts 128K, 4-2401 MOD-2, 9-2314, 1403-N1, 2540, 1401 Compatibility.</p> <p>From \$35/Hour</p> <p>Restaurant Associates, Inc. 1540 Broadway New York, N.Y. 10036</p> <p>Contact: Al Palmo (212) 974-4966 Charles Leigey (212) 974-4967</p>	<p>FREE SOFTWARE</p> <p>Why pay thousands of dollars for Payroll, Billing, Inventory, or Accounts Receivable software. Unlike other software cos. we don't believe in making all our profit off you! We have compiled a Library of Money making, Money saving! Advanced Business programs, all written in a language your computer will comprehend, BASIC. We also offer Games Eng. Stat, etc. For a little more than the price of the paper you could own tens of thousands of \$\$\$ worth of powerful software. Vol. III Ad. Bus. \$39.95. While they last. Add \$2 for hndl. plus postage. (Includes: A/R, Inventory, Payroll, etc. software) CASH/CK/MO/MC/BAC • S.R.I. 1712C Farmington Ct., Crofton, MD 21114.</p>	<p>SOFTWARE FOR SALE</p>																																												
<p>dataserv</p> <p>buy • sell • lease • trade</p> <table border="1"> <thead> <tr> <th>360</th> <th>370</th> <th>System/3</th> <th>Peripherals</th> </tr> </thead> <tbody> <tr> <td>360/30</td> <td>370/115</td> <td>5410</td> <td>Disks</td> </tr> <tr> <td>360/40</td> <td>370/125</td> <td>5415</td> <td>Tapes</td> </tr> <tr> <td>360/50</td> <td>370/135</td> <td>Sys/32</td> <td>Printers</td> </tr> <tr> <td>360/65</td> <td>370/145 +</td> <td>Peripherals</td> <td>Card I/O</td> </tr> </tbody> </table> <p>Call our "quotation hot-line" Toll free 800/328-2406 / or 612/544-0335</p> <p>Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd., P.O. Box 9488, Minneapolis MN 55440</p>					360	370	System/3	Peripherals	360/30	370/115	5410	Disks	360/40	370/125	5415	Tapes	360/50	370/135	Sys/32	Printers	360/65	370/145 +	Peripherals	Card I/O																								
360	370	System/3	Peripherals																																													
360/30	370/115	5410	Disks																																													
360/40	370/125	5415	Tapes																																													
360/50	370/135	Sys/32	Printers																																													
360/65	370/145 +	Peripherals	Card I/O																																													
<p>Computer Time Available</p> <p>360-40-256K • 360-40-128K 360-40-128K • 360-30-128K</p> <p>(18) 2401 180K.B. (18) 2314 Disk Drives (4) 1100 L.P.M. Printers</p> <p>Babbage Systems, Inc. 345 Park Ave. N.Y. Contact: George Kay (212) 688-1111</p>	<p>Local & Remote Computing On</p> <p>370/158</p> <p>OS/VS1-JES1 and CICS Very Attractive Rates 3330's, 3420's, 3211 and Microfiche 24 Hours - 7 Days Network Computing Corp. 4827 Park Road Charlotte, N.C. 28209 704-525-8810</p>	<p>COUNTRY CLUB BILLING SYSTEM</p> <p>\$1,150.00</p> <ul style="list-style-type: none"> • ANS Cobol • Multi-client • Will run on System/3 • Handles golf, swim & tennis, and social club billing • Monthly and annual revenue figures <p>PDS</p> <p>2101 Magnolia Ave. Suite 513 Birmingham, AL 35205 (205) 252-4241</p>																																														

software for sale

**ACCOUNTING IV**

General Ledger and
Financial Reporting

Accounts Payable

Accounts Receivable

Three fully integrated financial application systems, proved during years of successful use. Totally ANS COBOL. Call or write today for details.

Informatics Inc.

World's Largest in
Software Products

65 Route 4, River Edge, NJ 07661

New York: (212) 564-1258
New Jersey: (201) 488-2100
Chicago: (312) 325-5960
Los Angeles: (213) 887-9040
Massachusetts: (617) 481-1180
Philadelphia: (215) 265-7448
Sacramento: (916) 961-1881
Stamford, CT: (203) 357-7924
Dallas: (214) 750-0800

-CIMS-

Job accounting & system performance reporting product for IBM 370/360 computer users. CIMS supports all current releases and variations of DOS, DOS/VS, POWER/VS, OS/VS1, VS2, MVS, MFT, MVT, etc. The CIMS product is the only job accounting system to receive an award from Datapro for program excellence. To order a demonstration of CIMS without obligation, contact:

BMS Computer Inc.
P.O. Box 3086
Walnut Creek, CA 94598
(415) 938-2620

InSci Human Resource System**Now for Payroll** A user-controlled system -- up and running fast.

- wide-scope processing
- table-driven
- 999 different earnings, taxes, deductions
- labor distribution module
- powerful retrieval
- comprehensive documentation manuals
- fully supported implementation
- integrated with Human Resource System

Please send me information
on InSci Payroll!

Frank Cancro, Vice President

InSci

Information Science Incorporated

Dept. CW-C
95 Chestnut Ridge Road
Montvale, New Jersey 07645
201-391-1600

Name: _____

Title: _____

Company: _____

Address: _____

Phone number: _____

software for sale

**MMS
Accounts
Receivable**
(Eliminates the
Long Wait.



- Database Design—All Cobol
- Open Item or Balance Forward
- Multi-company
- Flexible Aging
- Simplified Cash Posting

**SOFTWARE®
INTERNATIONAL**
Elm Square, Andover, MA 01810
(617) 475-5040
® Registered trademark of Software International Corporation

**BANK
SYSTEMS**

Central
Information
Financial
Control System
Mortgage Loan
Time Certificates
of Deposit
Commercial Loan
Demand Deposit
Installment Loan
Savings

**COMDAR
CORPORATION**

247 Washington Street
Wellesley Hills, Mass. 02181
(617) 237-5585
Offices: Boston/Los Angeles

software for sale

Retrieve
Sales/Use Tax rates
automatically
with

SALESTAX

Many firms avoid costly tax assessments and save valuable staff time too, with...
SALESTAX
the magnetic tape file of all Sales/Use Tax Rates. Updated monthly. For free brochure call or write:

VERTEX SYSTEMS Inc.
an MAl company
650 Park Avenue
King of Prussia, PA 19406
215-337-0500

RPG II SYSTEMS

- *A/R-OPEN ITEM OR B/F
- *ACCOUNTS PAYABLE
- *GENERAL LEDGER
- *PAYROLL AND LABOR DIST.
- *INVENTORY
- *CREDIT UNION MAILING, ETC

Extensive Documentation Provided
Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

**MSA'S Software
systems*helped
our clients
manage well
over three trillion
dollars in assets
last year alone.**

If you'd like to find out how our full line of financial software systems (as well as the people we have in the field supporting them) can help you manage every aspect of your business, call Marge Kimbrough at (404) 262-2376 or send us this coupon.

MSA
THE FINANCIAL SOFTWARE COMPANY

Management Science America, Inc.
3445 Peachtree Road, N.E.
Suite 1300
Atlanta, Georgia 30326
(404) 262-2376

Chicago 312-986-2450;
Los Angeles 213-822-9766;
New York 201-871-4700

NAME _____
COMPANY _____
TITLE _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
PHONE _____ COMPUTER MODEL _____

- *
I am interested in:
☐ General Ledger
☐ Personnel Management and Reporting
☐ Payroll Accounting
☐ ALITAX™
☐ Supplies Inventory Control and Purchasing
☐ Accounts Receivable
☐ Accounts Payable
☐ Financial Information and Control
☐ Fixed Asset/Property Accounting

software for sale

PAYROLL PERSONNEL
SUPER/PAY
ONLY \$960
ANS COBOL
60+ USERS

Users on IBM, Burroughs, Univac and minis such as NCR, DG, & Four Phase

Easy to Use 30 Day Trial
Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

IMPACT

IBM 370
FINANCIAL/MARKETING
PACKAGE

- Reporting • Modeling
- Analysis • Planning

Features include:

- built-in business functions, forecasting
- Model building, editing
- What-IF Analysis
- Consolidations
- Plotting
- Conversationality
- Debugging Aids
- Language Interface...

Write: MDCR, INC.

P.O. Box 29
Morganville, New Jersey 07751

O-PAC Payroll
Mightiest System of All



- Comprehensive tax module
- Customized personnel processing
- Most flexible report writer
- Powerful general ledger interface

Other financial systems:

General Ledger
Accounts Payable
Accounts Receivable

**SOFTWARE®
INTERNATIONAL**
Elm Square, Andover, Mass. 01810
(617) 475-5040
® Registered trademark of Software International Corporation

software for sale

System/3
**General
Ledger**

- Financial data base
- Any chart of accounts
- Report Writer
- Allocations

Get MORE from
your System/3



**SOFTWARE®
INTERNATIONAL**

Elm Square, Andover, Mass. 01810
(617) 475-5040

® Registered trademark of Software International Corp.

***GENERAL LEDGER &
FINANCIAL REPORTING**

***ACCOUNTS
PAYABLE SYSTEMS**

If you need a new system next week instead of next year, we may be able to help. Designed for Multi-Company, Maximum Flexibility, Multi-Control Levels, Audit Control, efficient Thru-Put, Stack Processing. ANS COBOL.

To arrange an appointment to see these systems in operation, call or write:

C & S SYSTEMS, INC.
1001 22nd St South-Suite 202
Birmingham, Ala 35205
(205) 252-0400

TONE II

THE ONLY COMPLETE
TIME SHARING SYSTEM
FOR VSI
(CHECK THESE POINTS)

- EDIT WITH FULL SCREEN CAPABILITY
- INTERNAL READER JOB SUBMIT
- OUTPUT RETRIEVAL WITH REMOTE SUPPORT
- SYSTEM MAINTENANCE
- PROGRAM DEVELOPMENT
- DATA ENTRY
- SYSTEM DEBUGGING
- TEXT EDITING
- PERFORMANCE MONITORING SUPPORT
- USER COMMAND INTERFACE
- INTERACTIVE PROGRAM EXECUTION
- OPERATIONS ADDITIONAL CONSOLE SUPPORT
- DATASET MAINTENANCE
- CATALOG MANAGEMENT
- ISP SUPPORT
- REMOTE ENTRY SUBSYSTEM SUPPORT
- ENHANCED 3270 USABILITY
- FULL ASCII TERMINAL SUPPORT
- INTERACTIVE COMPUTING
- DATA INQUIRY

WRITE FOR DETAILS

TONE
Software Corp.
11588 TRASK AVENUE
GARDEN GROVE, CA 92643
(714) 636-8502

Whether you're buying, selling, swapping, hiring or looking,
Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/ Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy.

Cost: Our rates are \$49.70 per column inch. Minimum and size is two column inches and costs \$99.40 per insertion. Extra space is available in half-inch increments and costs \$24.85. Box numbers are \$1.00 extra.

Billing: If you're a first-time advertiser, we must have your payment in advance.

Ad Size: _____ Issue (Date(s)): _____ Section: _____

Signature: _____

Name: _____

Company: _____ Title: _____

Address: _____ Tel: _____

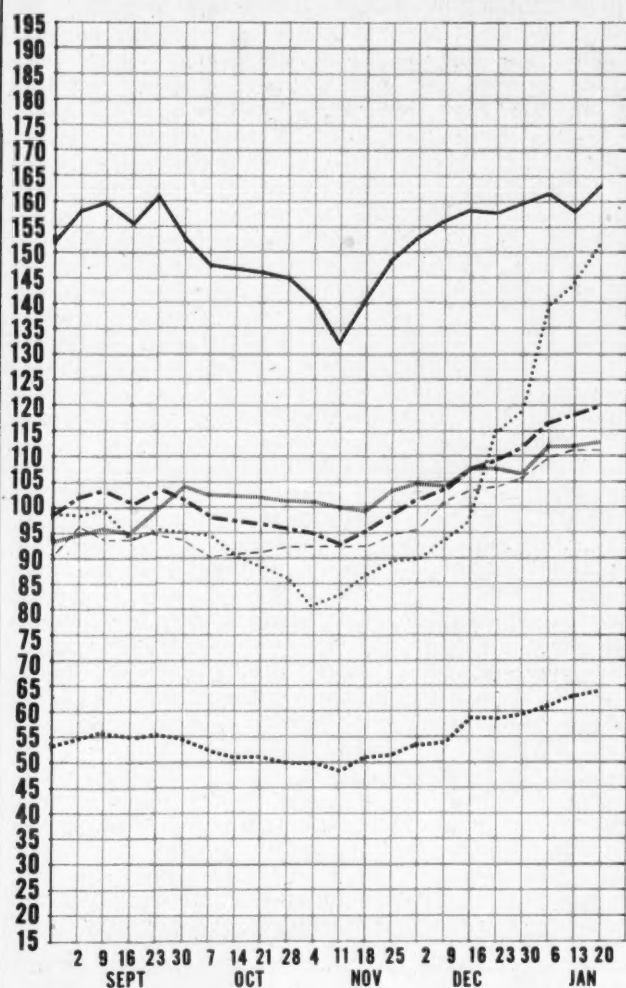
Send this form to: Pam Palmer, Classified Advertising,
or Kathy Steinberg, Position Announcements

COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160

Eastern Division Montvale, NJ 201-391-1600 •
Southern Division West Palm Beach, FL 306-988-8777;
Memphis, TN; Raleigh, NC • Midwestern Division
Oak Brook, IL 312-986-1620 • Central Division
San Antonio, TX 512-990-0110 • Western Division
Menlo Park, CA 415-864-1903; Newport Beach, CA

COMPUTERWORLD Computer Stocks Trading Indexes

Computer Systems Software & EDP Services
Peripherals & Subsystems Leasing Companies
Supplies & Accessories CW Composite Index



Earnings Reports

AMPEX		
Three Months Ended Oct. 30		
	1976	1975
Shr Ernd	\$.26	\$.33
Revenue	73,836,000	66,035,000
Tax Cred	824,000	1,521,000
Earnings	2,833,000	3,600,000
6 Mo Shr	.43	.47
Revenue	139,285,000	129,690,000
Tax Cred	1,500,000	2,128,000
Earnings	4,645,000	5,159,000

DATAPOINT		
Three Months Ended Oct. 31		
	1976	1975
Shr Ernd	\$.60	\$.57
Revenue	22,533,000	14,452,000
Tax Cred	495,000
Earnings	1,956,000	1,503,000

LUNDY ELECTRONICS & SYSTEMS		
Three Months Ended Sept. 30		
	1976	1975
Shr Ernd	\$.13	\$.20
Revenue	4,526,060	5,303,125
Spec Cred	79,000
Earnings	112,496	176,426

ON-LINE SYSTEMS		
Three Months Ended Oct. 31		
	1976	1975
Shr Ernd	\$.36	\$.18
Revenue	3,984,429	2,871,000
Earnings	307,682	153,986
6 Mo Shr	.66	.25
Revenue	7,616,938	5,073,991
Earnings	565,187	213,413

COMTEN		
Three Months Ended Sept. 30		
	1976	1975
Revenue	\$5,741,000	\$4,056,000
aSpec Charge	(115,000)	(127,000)
Loss	216,000	277,000
9 Mo Shr	.09	.01
Revenue	17,609,000	12,230,000
Tax Cred	74,000	7,000
Earnings	224,000	15,000
a-Debit	against	tax-loss
carry-forward.		

Computerworld Sales Offices

National Sales Manager
Roy Einreihof
Advertising Administrator
Judy Milford
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Account Manager
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
1212 Hearst Bldg.
San Francisco, Calif. 94103
Phone: (415) 495-0990

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Chris Canary
Account Coordinator
1434 Westwood Boulevard
Los Angeles, CA 90024
(213) 475-8486

Japan:
Mr. Shigema Takahashi
General Manager
Dempal/Computerworld
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Phone: (03) 445-6101
Telex: Japan-26792
United Kingdom:
Roger R. Frampton
Computerworld Publishing Ltd.
140-146 Camden Street
London NW1 9PF, England
Phone: (01) 485-2248
Telex: UK-26-47-37
West Germany:
Manfred Kufner
Computerworld GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 19, 1977

All statistics compiled,
computed and formatted by
TRADE*QUOTES, INC.
Cambridge, Mass. 02139

E X C H	PRICE				
	1976-77 RANGE (1)	CLOSE JAN 19 1977	WEEK NET CHNGE	WEEK PCT CHNGE	
COMPUTER SYSTEMS					
D AMDAHL CORP	23-40	35 1/4	+ 1/4	+0.7	
N BURROUGHS CORP	79-108	78 7/8	-7 3/8	-8.5	
D COMPUTER AUTOMATION	10-23	23 1/4	+4 7/8	+26.5	
N CONTROL DATA CORP	18-27	26 1/4	+1 1/2	+6.0	
N DATA GENERAL CORP	40-60	43 7/8	+2 5/8	+6.3	
D DATAPOINT CORP	24-46	26 1/4	-2	-7.0	
D DIGITAL COMP CONTROL	2-7	6 7/8	+1/2	+7.8	
N DIGITAL EQUIPMENT	46-60	49 5/8	-7/8	-1.7	
N ELECTRONIC ASSOC.	2-5	2 7/8	+1/8	+4.5	
A ELECTRONIC ENGINEER.	7-16	9 3/8	-1/8	-1.3	
D FOUR-PHASE SYSTEMS	13-21	16 1/4	+1/8	+0.7	
N FOXBORO	28-51	45 1/2	+1/2	+1.1	
D GENERAL AUTOMATION	4-11	8 1/8	+3/8	+4.8	
D GRI COMPUTER CORP	1-1	1 1/2	0	0.0	
N HEWLETT-PACKARD CO	78-117	79 3/8	-3/8	-0.4	
N HONEYWELL INC	34-56	47 1/4	+1	+2.1	
N IBM	227-288	277 1/2	+8 1/2	+3.1	
D MANAGEMENT ASSIST	1-9	7 5/8	+3/4	+10.9	
D MEMOREX	17-33	27	+3 7/8	+16.7	
D MICRODATA CORP	10-28	15 1/2	+3/4	+5.0	
D MODULAR COMPUTER SYS	3-14	6 1/8	+5/8	+11.3	
N NCR	24-38	35 1/2	-5/8	-1.7	
D PRIME COMPUTER INC	4-18	15 1/4	-3/4	-4.6	
N PERKIN-ELMER	19-27	19 1/2	0	0.0	
N RAYTHEON CO	45-67	59 3/4	+2 1/2	+4.3	
N SPERRY RAND	40-52	40 1/4	+1/8	+0.3	
D SYCOR INC	9-31	13 5/8	+3/8	+2.8	
A SYSTEMS ENG. LABS	5-10	6 3/4	+1/2	+8.0	
N VARIAN ASSOCIATES	12-17	16 1/4	+5/8	+4.0	
A WANG LABS.	11-20	13 3/4	-1/2	-3.5	
LEASING COMPANIES					
D BOOTH COMPUTER CORP	1-9	9	-1/4	-2.7	
D COMDISCO INC	3-10	9 3/4	+1/4	+2.6	
A COMMERCE GROUP CORP	2-3	2 1/8	0	0.0	
A COMPUTER INVSTRS GRP	1-3	2 1/8	+1/8	+6.2	
M DATRONIC RENTAL	1-8	1 1/2	-1/8	-7.6	
A DCL INC	1-1	7/8	0	0.0	
N DPF INC	5-8	8 1/8	+3/4	+10.1	
N ITEL	6-16	15 1/2	+1 1/4	+8.7	
N LEASCO CORP	6-22	21 1/2	+1 3/4	+8.8	
D LEASPCAP CORP	0-1	3/4	0	0.0	
D NRG INC	0-1	1 1/4	+1/16	+32.9	
A PIONEER TEX CORP	6-9	8 1/8	0	0.0	
N U.S. LEASING	7-12	11	0	0.0	

E X C H	PRICE				
	1976-77 RANGE (1)	CLOSE JAN 19 1977	WEEK NET CHNGE	WEEK PCT CHNGE	
SOFTWARE & EDP SERVICES					
D ADVANCED COMP TECH	1-3	1 3/4	0	0.0	
D ANACOMP INC	6-11	7 3/4	+5/8	+8.7	
A APPLIED DATA RES.	2-7	5 3/4	-1/8	-2.1	
N AUTOMATIC DATA PROC	17-35	27 7/8	-1/8	-0.4	
D COLEMAN AMERICAN COS	2-6	2 1/4	0	0.0	
D COMPU-SERV NETWORK	3-15	14	+2 3/4	+24.4	
D COMPUTER DIMENSIONS	3-7	6 1/2	-3/8	-5.4	
D COMP ELECTION SYSTEMS	5-9	6 1/2	-1/2	-7.1	
D COMPUTER HORIZONS	1-2	1 1/4	0	0.0	
D COMPUTER NETWORK	2-8	7 1/4	+5/8	+9.4	
N COMPUTER SCIENCES	4-9	8 3/4	+1/2	+6.0	
D COMPUTER TASK GROUP	1-2	1 1/4	0	0.0	
D COMPUTER USAGE	2-6	2 3/8	0	0.0	
D COMSHARE	2-9	5 1/4	+1/4	+5.0	
D DATA DIMENSIONS INC	2-5	4 1/8	+1/8	+3.1	
D DATATAB	1-2	1 3/8	-1/8	-8.3	
N ELECTRONIC DATA SYS.	12-18	17 3/4	+5/8	+3.6	
D INFONATIONAL INC	1-1	1/8	0	0.0	
D INSYTE CORP	1-3	2 3/8	0	0.0	
D IPS COMPUTER MARKET.	1-2	3/4	-1/4	-25.0	
D KEANE ASSOCIATES	2-4	2 1/2	+1/4	+11.1	
D KEYDATA CORP	1-5	1 3/4	0	0.0	
A LOGICON	3-8	7 3/4	+1/4	+3.3	
A MANAGEMENT DATA	1-3	1 3/8	-5/8	-31.2	
A NATIONAL CSS INC	13-25	23 3/4	-7/8	-3.5	
D NATIONAL DATA CORP	4-7	5 7/8	-1/4	-4.0	
A ON LINE SYSTEMS INC	17-23	20	+1/4	+6.2	
N PLANNING RESEARCH	3-5	4 1/4	+1/8	+4.1	
D PROGRAMMING & SYS	1-1	3/8	+1/8	+50.0	
D RAPIDATA INC	2-5	2 3/8	-1/8	-5.0	
D REYNOLDS & REYNOLD	13-21	19 1/2	+1/4	+1.2	
D SCIENTIFIC COMPUTERS	1-1	1	-1/8	-11.1	
D TMSHARE INC	14-28	18 1/2	+1/2	+2.7	
A URS SYSTEMS	3-5	3 7/8	0	0.0	
N WYLY CORP	1-7	2	-1/8	-5.8	

PERIPHERALS & SUBSYSTEMS					
N ADDRESSOGRAPH-MULT	8-14	13 5/8	+3/8	+2.8	
D ADVANCED MEMORY SYS	4-10	8	+1/8	+1.5	
N AMPEX CORP	5-10	9 3/8	+1 1/8	+13.6	
D ANDERSON JACOBSON	2-4	3 1/4	-1/8	-3.7	
D APPLIED DIG DATA SYS	13-25	16	+1 3/4	+12.2	
D BEEHIVE MEDICAL ELEC	3-11	10 1/2	+1/2	+5.0	
A BOLT-BERANEK & NEW	7-11	7 7/8	+1/8	+1.6	
N BUNKER-RAND	5-10	9 1/4	+1 1/4	+15.6	
A CALCOMP	4-7	4 5/8	-1/2	-9.7	
D CAMBRIDGE MEMORIES	0-6	1 1/2	+1/4	+20.0	
N CENTRONICS DATA COMP	20-36	25 3/4	+1/2	+1.9	
D CODEX CORP	22-42	37 1/2	+4	+11.9	
D COGNITRONICS	1-1	1 1/8	+1/8	+12.5	
D COMPUTER COMMUN.	1-6	5 7/8	-3/8	-6.0	
D COMPUTER CONSOLES	4-7	4 3/4	+1/4	+5.5	
A COMPUTER EQUIPMENT	1-3	2	+1/8	+6.6	
D COMPUTER TRANSCIVER	1-3	1	-1/8	-11.1	
D CONTEN	4-11	11 1/4	+1 1/4	+12.5	
N CONRAC CORP	20-27	24 7/8	-5/8	-2.4	

E X C H	PRICE				
	1976-77 RANGE (1)	CLOSE JAN 19 1977	WEEK NET CHNGE	WEEK PCT CHNGE	
SUPPLIES & ACCESSORIES					
D DATA ACCESS SYSTEMS	1-5	4 1/4	0	0.0	
D DATA 100	6-13	7 5/8	-3/8	-4.6	
A DATA PRODUCTS CORP	5-15	12 1/8	0	0.0	
D DATA TECHNOLOGY	1-3	3 1/4	0	0.0	
D DATUM INC	1-2	1 1/4	-1/8	-9.0	
D DECISION DATA COMPUT	1-4	1 7/8	+1/8	+7.1	
D DELTA DATA SYSTEMS	1-1	3/8	0	0.0	
N ELECTRONIC M & M	1-4	4 3/8	+1/8	+2.9	
D FARRI-TEK	1-1	1	+	+6.2	
D GENERAL COMPUTER SYS	0-2	1 1/2	0	0.0	
N HAZELTINE CORP	4-12	11 3/8	+1 1/8	+10.9	
N HARRIS CORP	28-57	32 7/8	+4 3/8	+15.3	
A INFOTERM CORP	9-20	12 3/4	+1/2	+4.0	
D INFOTEX INC	3-7	5 7/8	0	0.0	
D INFORMATION INTL INC	10-18	13 1/2	-1/8	-0.9	
D INTEL CORP	47-109	56	+2	+3.7	
A LUNDY ELECTRONICS	3-7	4 5/8	-1/8	-2.6	
D MSI DATA CORP	3-7	6 1/4	+1/8	+2.0	
N MILGO ELECTRONICS	15-22	21 5/8	+7/8	+4.2	
N MOHAWK DATA SCI	3-10	7 1/4	+1/2	+7.4	
D PENRIL CORP	1-3	2	-1/8	-5.8	
A PERTEC CORP	3-8	8	-1/4	-3.0	
A POTTER INSTRUMENT	2-2	1 3/4	0	0.0	
D PRECISION INST.	2-10	1 1/2	0	0.0	
D QUANTOR CORP	4-6	4 3/4	0	0.0	
D RECOGNITION EQUIP	6-11	9 3/8	0	0.0	
N SANDERS ASSOCIATES	6-11	10 5/8	+1/2	+4.9	
D SCAN DATA	1-4	1 3/8	-1/8	-8.3	
D STORAGE TECHNOLOGY	9-13	12 1/4	+1	+8.8	
D T RAR INC	5-10	7 1/8	+1/8	+1.7	
D TALLY CORP.	4-6	5 3/8	0	0.0	
D TEC INC	3-9	7 1/2	-1/2	-6.2	
N TEKTRONIX INC	45-69	59 1/2	-3 3/4	-5.9	
N TELEX	2-5	3 3/8	+1/2	+17.3	
D WANGCO INC	11-22	17 1/2	0	0.0	
D WILTEK INC	1-2	1 1/4	-1/8	-33.3	

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Does your IBM host computer do too much telecommunications housekeeping and not enough computing?



Introducing Flexicom's IBM-compatible telecommunications system. With clean, quick, simple host interfacing.

If your company is using a communications network, your host computer's applications growth is limited because of expanding workloads and lack of sufficient support.

The consequences? — Escalating staff and equipment problems. And, of course, the bottom line is increasing costs for your data processing system.

For these reasons, DPF introduces Flexicom.

Consistent Systems Architecture.

Flexicom's software frees your host computer of telecommunications housekeeping by organizing the network and placing tasks where they belong—with Flexicom. That's because it operates as a front-end or distributed processor.

And Flexicom serves your operation by acting as a complete telecommunications system. With fast, clean, and uncomplicated host computer interfacing.

IBM hardware. IBM-compatible software.

With Flexicom you don't have to "pioneer." The hardware is a general purpose IBM 360/370 computer sized to your requirements and compatible with your IBM software.

This means only minimal user programming is necessary to integrate Flexicom with your host computer.

A cost-effective, long-term solution.

Flexicom is an inexpensive, long-term solution to data communications problems.

IBM hardware in a telecommunications system that's basically an IBM solution means little training will be required of your staff. Consistent Systems Architecture means future needs will be readily accommodated as they develop. Fewer problems with more efficient equipment means a more productive staff.

And your host computer will be free to do the basic bottom line work.

Additional Flexicom advantages.

- More local processing capabilities than existing competitive systems.
- The network is transparent to the host computer.
- Off-load TP monitoring from the central processing unit.
- Extensive network control statistics.
- Message switching.

We do more than lease IBM computer systems.

DPF is one of the largest 360/370 computer leasing firms in the country. But we do more than lease computers.

With innovative systems like Flexicom, DPF is taking IBM computer systems a step further for our clients.

Let us tell you how Flexicom can help. Call Ed Zukerman collect, at (914) 428-5000.

Or just mail this coupon.

flexicom

I'm interested in hearing more about DPF and Flexicom.

- ☐ Please have your representative contact me.
- ☐ Please send me a brochure and more information.

Name _____

Title _____

Phone Number/Ext. _____

Company _____

Address _____

State/Zip _____

Send to: Flexicom
DPF Incorporated
141 Central Park Ave. S.
Hartsdale, N.Y. 10530

dpf
INCORPORATED